SKYWAYS

MILITARY * CIVIL * COMMERCIAL AVIATION

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Nat'l Air Races 1949 by Tony LeVier

☆

Pilot's Report... New Navion

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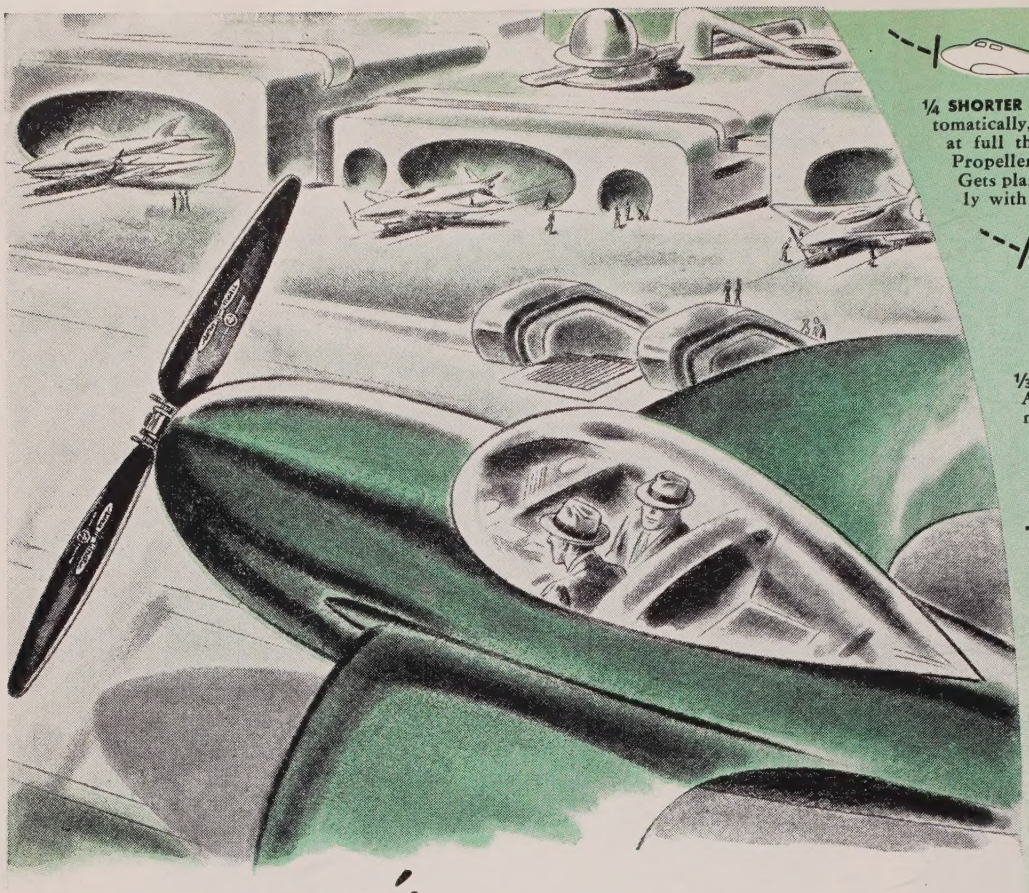
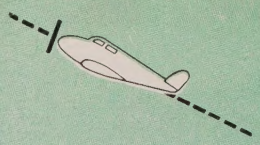
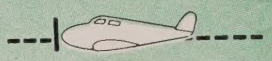


¼ SHORTER TAKE-OFF: Automatically, with the engine at full throttle, Aeromatic Propeller assumes low pitch. Gets plane off ground quickly with full take-off power.



⅓ HIGHER RATE OF CLIMB: Automatically responds to natural forces. Increases pitch as air speed rises. Gets plane to cruising level fast, on minimum fuel.



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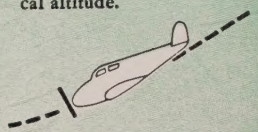

SAFER LANDINGS: Automatically adjusts its pitch for a long, flat glide. Moves to low pitch instantly for a quick pickup if pilot overshoots the field.

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Wayne Brown,
Denver, Colo.

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Also available for numerous foreign models

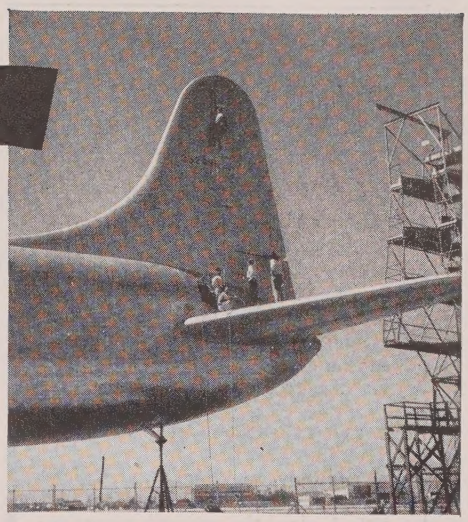
FASCINATING WORK RICH REWARDS IN AERONAUTICAL ENGINEERING

Right in this magazine, and in your daily newspaper, you see unfolding the swift, spectacular progress of *Aviation*—sensational new speed records ...ever-expanding, world-wide commercial airlines...spectacular new military aircraft. Right before your eyes are these thrilling achievements of *Aeronautical Engineers*—swifter, more powerful, more efficient planes ...performing ever more amazing feats.

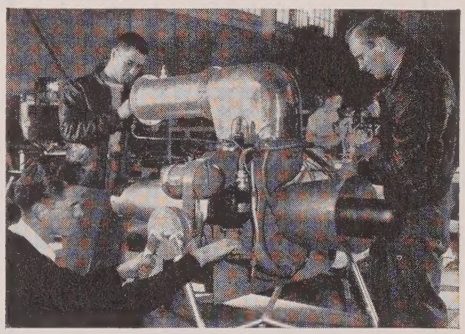
Back of the countless new aircraft and new achievements yet to come, there must be trained engineers performing their fascinating duties, and enjoying the rich rewards of success, personal achievement, and the thrill of contributing to the great *Air Age.*

Here is a ringing challenge to the young man of imagination and ambition. Here is a career field where your talents—whether creative or practical—can have full play. Here is the ideal combination of security, unlimited opportunity, interesting work, and good earnings.

Models and contestants in one of the frequent meets held by Northrop Model Club. Through model building, students express the expanding knowledge of aircraft design and construction acquired during their aeronautical engineering training.



BIG JOB for engineers was inspection of completed 57-foot-high tail fin on Air Force's XC-99 Consolidated Vultee transport, world's largest land plane ...an example of the interesting and varied duties performed by aeronautical engineers.



As a practical training project, Northrop engineering students developed this lightweight turbojet aircraft engine by adapting a fighter plane turbosupercharger, the students themselves designing and building the combustion chamber, ducts, tail pipes, and electric controls.

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Here is detailed information on opportunities in *Aviation*...and a complete description of *Northrop's* 2-year *Aeronautical Engineering* course. This big, beautifully printed booklet contains many interesting photographs of Northrop planes and plant scenes. Send coupon for your free copy.

Northrop student engineers consult on dual control arrangement for student-designed and built private plane. Complete metal mock-up shown here was fabricated and assembled by students as part of practical training project.

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Coming Up... in SKYWAYS

October is a good month for you to get out those airways charts and start scanning the horizons for winter vacation spots. Pilots and plane owners are the ones who can escape snow and cold and capture sunshine and warm weather . . . via airplane, of course.

SKYWAYS' October issue features:

● **"Holiday on Wings,"** *by Arthur R. Otis.* The owner of well-known Otis Lodge, the airmen's resort in Minnesota, took a vacation himself recently and flew to Mexico. The report of Mr. and Mrs. Otis' flying jaunt to Mexico is certain to instill a similar desire for adventure in pilot-readers. What's more, Otis' article is filled with air travel hints and pilotage cues for all airmen who contemplate air treks to distant places.

● **"Pilot's Report—New Piper Cub,"** *by Don Downie.* In answer to numerous requests for a pilot check story on this popular trainer, Pilot-author Downie has a go at flying the newest *Cub*. His findings and reactions he reports in this detailed "Pilot's Report . . ."

● **"Instrument Flying,"** *by Bill Odom.* One of the most capable men behind a stick, Capt. Odom passes on to readers pages of good pilot information on flying instruments and on flying at night. Odom's views and cues make interesting and informative reading to all flyers, whether they be students or already licensed airmen with Instrument tickets.

● **"F-94,"** Along strictly military lines, SKYWAYS offers the latest data and details on the USAF's newest all-weather jet night fighter. The F-94 is Lockheed's answer to the USAF's request for a jet ship that can intercept the enemy at high altitude and under weather or night conditions.

● **"F-84."** This ship is one of Republic's versions of the famed and fighting *Thunderjet*. This particular model of the F-84 is equipped with side inlet ducts instead of the conventional nose air intake. The new ducts were developed in cooperation with NACA.

These are just a few of the features you will want to read in SKYWAYS

October Issue

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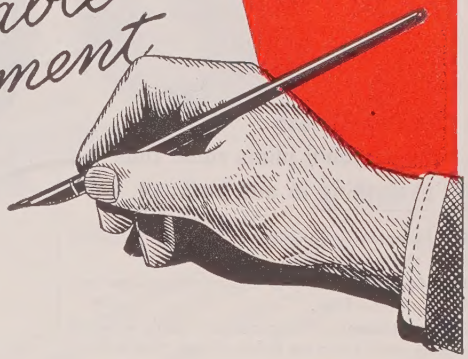

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Lear OMNIMATIC* A high quality, Very High Frequency navigational receiving system which "*pictures*" on one instrument (Omniscope), *the omni-range station magnetic bearing, the instant you tune it in.* Gives immediate cross bearings on all VHF omni-stations wherever you may be. Tells you your location at all times!

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AIR YOUR VIEWS

Trailing Antenna

Gentlemen:
In the article "Magic Multiplier" in the June issue, reference was made to a company manufacturing trailing antennas. Could you please let me have the name and address of that company?

WM. McGREGOR
New York, N. Y.

Trailing antennas are being built for aircraft by Aeronautical Radio Manufacturing Company, at Mineola, Long Island, New York. That company, by the way, supplied many of the photos used to illustrate Ben Robin's "Magic Multiplier" article.—Ed.

Accident Report

Gentlemen:
According to the May issue, the CAA has released a yearly accident report booklet. I'd like to have a copy, but don't know the address of the CAA.

WALTER MINN
Chicago, Illinois

Address your request to either CAA, Third Region, Chicago Orchard Airport, Park Ridge, Illinois; or to Aviation Information, CAA, Commerce Building, Washington 25, D. C.—ED.

Blackburn Lincock

Gentlemen:
Could you please give me some information on the old English Blackburn *Lincock* fighter of 1928? What air force did it serve or was it only experimental?

DAVID RANKIN
Malden, Massachusetts

According to the Air Annual of the British Empire (1931 edition), there were two Blackburn Lincock's *built: one was an all-wood plane (1928,29) and the other was an all-metal (1930,31). Both were single-seater fighters in the so-called "light" category. The all-metal version was powered by an Armstrong Siddeley Lynx Major and it had a top speed of 162 mph at 3,000 feet; 156 mph at 10,000 feet. It had a service ceiling of 20,000 feet and a rate of climb of 1470 fpm from 3,000 feet. It was a biplane and was built for use as either a light fighter, a trainer, a patrol plane or as a mail plane. The all-wood plane was built strictly for research and demonstration while the all-metal went into production for "certain foreign countries." It apparently was not used by the RAF.* —ED.

Grumman Skyrocket

Gentlemen:
I would like information on the Grumman *Skyrocket*. As I remember it, it was a twin-engine twin-tail fighter.

M. GINSBERG
New York, N. Y.

Your memory is good, Milton. The Grumman Skyrocket *was a twin-engined, twin-tailed fighter. It was powered by two 1200-hp engines which gave it a reported top speed of 427 mph. It had a wing span of 42 feet and was 31 feet 11 inches long. The wings were low with a slight sweep-back and taper to the square tips. The engines were hung in nacelles that extended back from a point ahead of the leading edge to the trailing edge of the wing. The Navy's designation was XF5F-1 while the Air Force (then Air Corps) called it the P-50. Orders for this ship were cancelled in early 1941 or 1942, and so no* Skyrockets *were ever delivered to either the Navy or Army.*—ED.

Thank YOU

Gentlemen:
Just thought I'd write to thank you for the Neil Fulton article "Stop, Look and Relax." I myself have experienced a forced landing as a result of engine failure, and so know first-hand that the advice Fulton offers is the "bestes' and the mostes'." Had I known then what I have now learned from Neil Fulton's piece, I might have been spared some painful injuries.

Might I suggest that illustrative material on the technique and know-how of forced landings be tacked up on bulletin boards at every airport in the country.

BRUCE H. BENEDICT, F.A.
U.S.S. Mercer
U. S. Navy
Green Cove Springs, Florida

Rose Parakeet

Gentlemen:
Would you have any ideas as to where a Rose *Parakeet* could be found?

D. FULTON
Los Angeles, California

We've had a lot of letters asking us almost that same question. Latest info we've been able to pick up is that Foster Hannaford of Winnetka, Illinois, is building the 40-hp single-place biplane, the Rose Parakeet. *I think Hannaford has a new model out. Write him.*—ED.

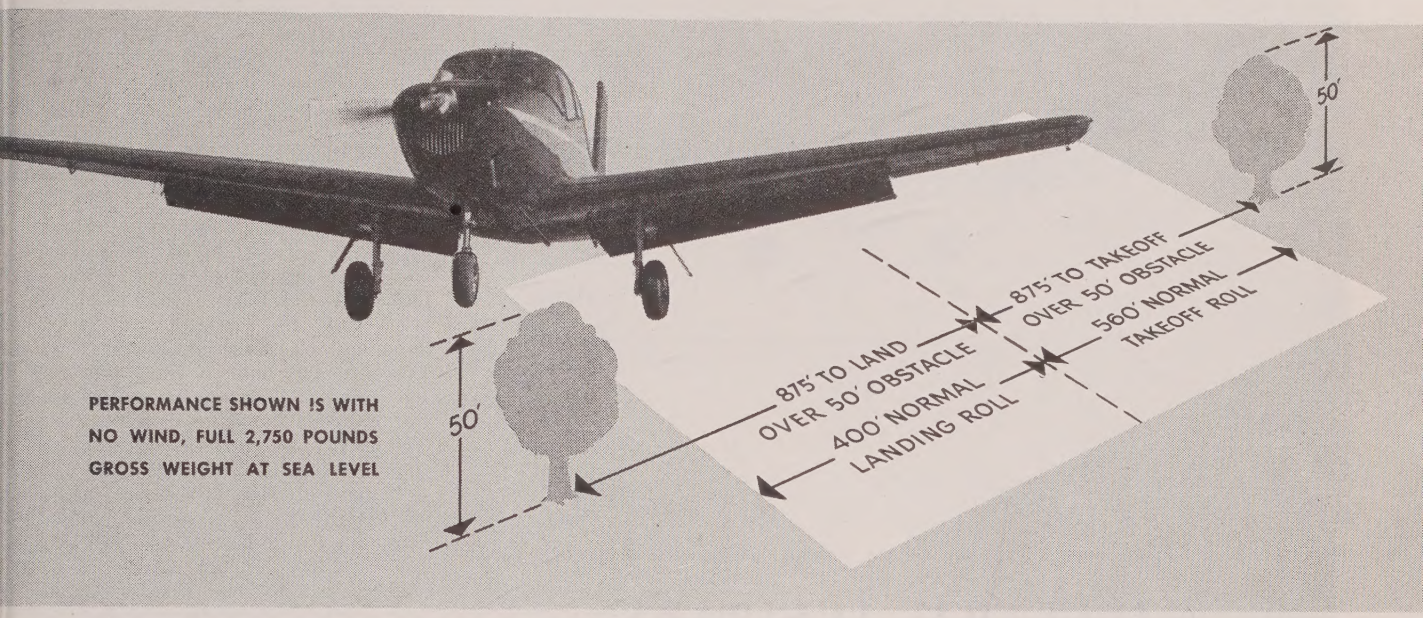
What is it?

Gentlemen:
Recently I saw a picture of a twin-engine, twin-tail airplane. It had its horizontal tail surface mounted half-way up the vertical fins. Could you tell me what plane that was?

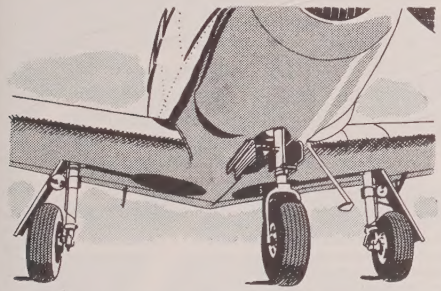
JOSE G. MARTINEZ
Santiago de Cuba

That plane was a Cancargo Loadmaster, *built in Canada under the well-known Burnelli patents. Burnelli features the "lifting fuselage" in his designs. This fuselage is an all-metal airfoil section with flat sides carrying crew nacelle and engines at forward end with twin booms extending aft for carrying tail unit. Plane is a cargo carrier powered by two 1,200-hp Pratt & Whitney engines. The "CF" designation indicates it is Canadian.*—ED.

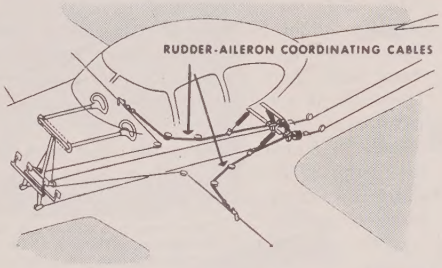
SHORT FIELD PERFORMANCE LIKE THIS PUTS NAVION IN A CLASS BY ITSELF FOR UTILITY


PERFORMANCE SHOWN IS WITH NO WIND, FULL 2,750 POUNDS GROSS WEIGHT AT SEA LEVEL
50'
875' TO LAND OVER 50' OBSTACLE
400' NORMAL LANDING ROLL
875' TO TAKEOFF OVER 50' OBSTACLE
560' NORMAL TAKEOFF ROLL
50'

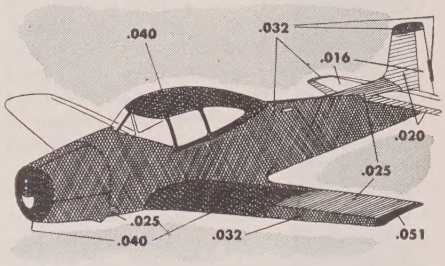
DON'T WORRY if that smooth, concrete runway is miles from where you want to go. A *Ryan Navion* will take you into short, rough strips... and out again, with ease and safety. Think of it! *Navion* lands at only 54 m.p.h. with full gross load. Its high-lift, full-deflection flaps lower 43° to make possible slow, steep approaches. Only 875 feet are needed to clear a 50-ft. obstacle—both on landing and take-off. *Navion's* husky 205 h.p. engine will give you 900-ft. of altitude in your *first minute* of flight! Performance like this is mighty important to the man who wants a rugged, versatile plane with plenty of utility that'll get him there and put him down right where he's needed. Yes, *Navion's* short-field performance is a big reason why it's the growing favorite among businessmen pilots.



WIDE WHEEL TREAD and high ground clearance...big, steerable balanced nosewheel and oversize tires enable you to set the *Navion* down smooth as velvet on rough, soft fields, even in cross winds. Big, equalized hydraulic brakes ease ground-handling. Deep-stroke hydraulic shocks are real heavyweights.



SAFE, AND EASY-TO-FLY, the 155 m.p.h. *Navion* has amazing stability, is gentle and well-behaved..."forgives" pilot error short of foolhardiness. It features "two control after take-off"...yet you have rudder when you want it. Stall-resistant wing gives aileron control *below* stalling speed for safety.



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- Improved Control Panel
- More Instruments
- Dual Fuel System

NAVY'S newest *Constellation* was designed to test electronic devices. Note the new radomes

MILITARY AVIATION

The United States Air Force will begin training 1,000 aviation cadets a year as navigators for long-range bombers of the Strategic Air Command and transports of the Military Air Transport Service. The program will begin at Ellington Air Force Base, Houston, Texas, in November when the first class of 100 cadets reports for the one-year course.

Latest methods of radar navigation will be taught to the cadets. They will spend 184 hours in "flying classrooms" including instructions in the new T-29, a version of the twin-engine *Convair* airliner adapted for navigation training.

Cadet navigator graduates will receive commissions as second lieutenants in the Air Force and aeronautical ratings as navigators. Outstanding graduates will receive regular commissions. All graduates will have opportunity to compete for regular commissions during a three-year tour of active duty.

To be eligible for aviation cadet navigator training, men must be 20 to 26½ years of age, United States citizens, and may be either single or married. They must have at least two years of college or the ability to pass an equivalent examination. Qualifications for navigator training are the same as for pilot training except for vision and hearing requirements, which are more stringent for cadet pilots.

June 1949 marked the end of an era for Naval Aviation when cruiser and battleship catapault airplanes were replaced by helicopters. Ever since the first days of Glenn Curtiss and Lt. T. G. Ellyson back in 1912, the "Gooney Birds" have been an integral part of the fleet, scouting ahead of the main force, spotting for heavy bombardment, carrying mail and passengers between units, and rescuing other downed airmen.

Lieutenant T. G. Ellyson made the first successful catapault launching at the Washington Navy Yard on November 12, 1912 and proved his contention that an airplane could be shot into the air. From that point on, seaplanes for shipborne work took their place in Naval Aviation. However, it wasn't until 1915 that a catapault was placed aboard a naval vessel. The *USS North Carolina* was the first to be equipped with a catapault track straddling the upper turret where it effectively blocked gunfire.

The size and the shape of the scout observation planes changed in the years between the wars but the speeds of 90 to 110 knots did not. Lumbering, awkward and rugged, it took real aviators to fly these "Gooney Birds" and make recoveries in the open sea alongside heaving ships.

Future scout observation aviators will no longer be required to suffer stiff necks from catapaults or grey hair and ulcers from trying to set down on top of a swell with a choppy sea running. Experience in the recent maneuvers proved that the "eggbeaters" can perform all the tasks of the old floatplanes plus some that were impossible for the "Gooney Birds."

The 1856th Flight Checking Squadron carries the distinction of being the only one of its kind in the Air Force. Recently formed at Tinker Air Force Base in Oklahoma City, the squadron will check all radio and electronic aid facilities within the continental limits of the United States. The pilots and crewmen of the 1856th will assist all armed forces bases in maintaining all such facilities at the highest operational standard at all times.

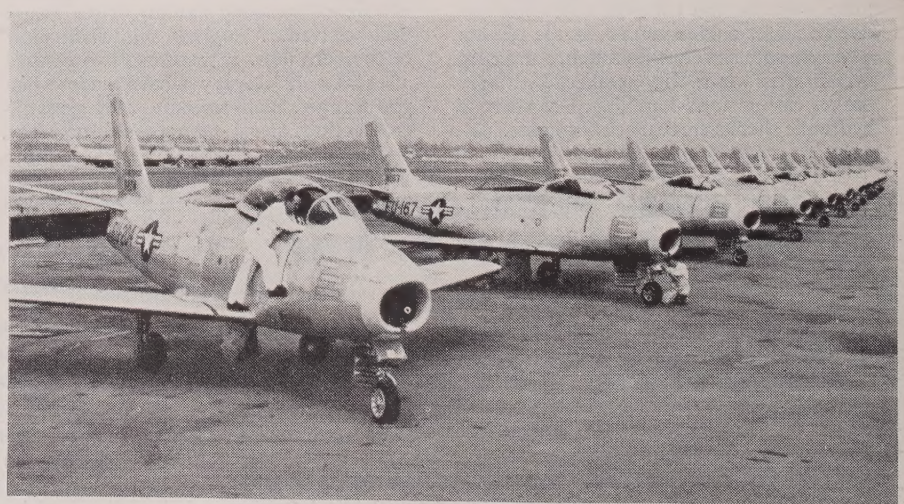
Plans for the squadron came into being through the combined efforts of the Civil Aeronautics Administration, Will Rogers Field, and the 1800th Airways and Air Communications Wing, Tinker Air Force Base, both in Oklahoma City.

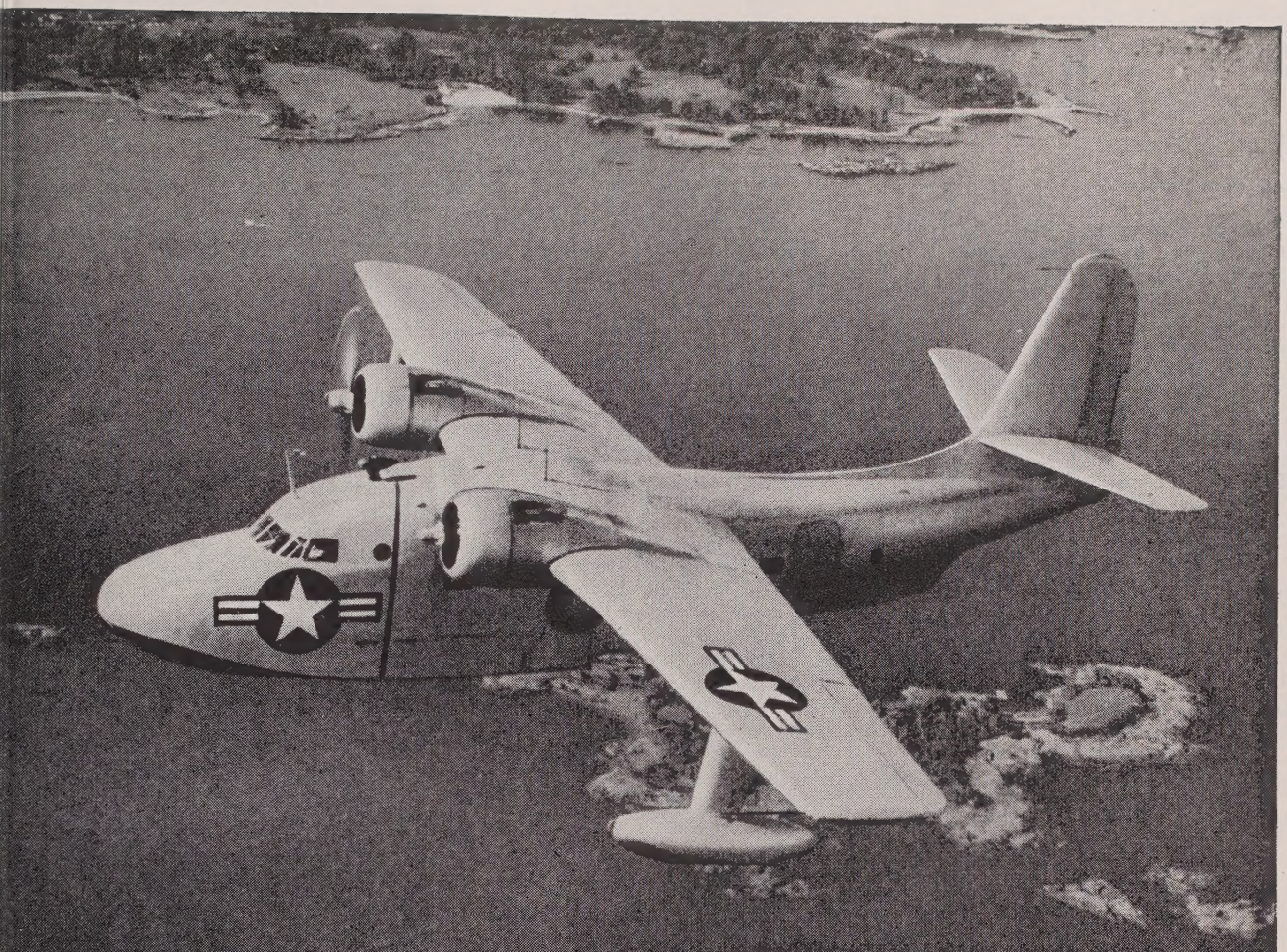
Already in operation and due to reach its maximum strength in September, the squadron will check over 300 facilities such as ground controlled approach systems, radio ranges, fan markers, radar beacons, homing beacons, etc.

Specially equipped C-47's, patterned after one currently used by the CAA, will do the checking. However, additional modification will be necessary to handle radar facilities used by military airfields. Wright-Patterson AFB Modification Center in Dayton will modify the aircraft.

Flight checks will be made by highly trained crews operating from the central location at Tinker. Arrangements have been made with CAA officials to send squadron crews to the CAA school at Will Rogers Field. Upon completion of the course, the crews will receive CAA Flight Checking certificates.

USAF'S new F-86 jet fighters are speeding off assembly line at North American's L. A. plant





Grumman

Designers and builders of AIRCRAFT

U.S. Air Force's New Albatross

This powerful twin-engine amphibian is designed for sea rescue work, cargo transportation, the carrying of personnel and for service in twin-engine seaplane training. Its features include a large hatch built into the overhead to facilitate loading of cargo and a "Dutch-type" door in the side with a lower half which can be independently closed to provide greater freeboard in rough water.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, LONG ISLAND, NEW YORK

Contractors to the Armed Services

HANGAR FLYING

Air Race Dates

If you're planning a trip to Cleveland, Ohio to take in the famed National Air Races, here are the dates and races:

Aug. 29 to Sept. 1: Qualifying Trials.
Sept. 3: Bendix Trophy Race for $25,000 purse.
Sohio Trophy, 105-mile course, for $7,500 purse.
Elimination heats for Goodyear Trophy Race.
Sept. 4: Tinnerman Trophy, 105-mile course, for $7,500 purse.
Women's AT-6 Race, 75 miles, for $5,500 purse.
Semi-Finals Goodyear Race.
Sept. 5: Thompson Trophy Race, 225 miles, for $40,000 purse.
Finals Goodyear Trophy, 24 miles, for $25,000 purse.

New Plane Line-Up

Things are happening in the experimental field as far as lightplanes are concerned. The past few weeks have brought word of several new ideas being worked out in various sections of the country . . . and with each "report" comes "assurance of production." Here are the new ones:

1. Jamieson *Jupiter,* a three-place all-metal 115-hp plane. This one expects to be CAA-certificated soon.
2. Lanier Aircraft of Marlton, N. J., announces the *Paraplane,* using an unorthodox "vacu-jet" wing which is controlled from the cockpit to give flap, airbrake and boundary layer control effect. It is a two-place ship powered by 90-hp engine, has 20-foot span.
3. Johnson Aircraft Corp., of Tyler, Texas has come up with the *Bullet,* a four-place all-metal 185-hp successor to the former Johnson *Rocket.*
4. Willard Custer of Hagerstown, Maryland announces he expects to resume tests on his channel-wing plane soon. This one is powered by two 75-hp Lycoming engines, and was designed for very slow speeds.
5. Up Connecticut way, a former North American Aviation man has come up with a new and so-called low-cost design which he calls the *Strat.* It is a four-place all-metal personal plane powered by 150-hp Franklin engine. It hadn't completed its flight tests at time of writing.

	Complete Aircraft			Manufacturer's Net Billing Price		
	Shipments			Shipments		
	TOTAL Jan-May	May	April	TOTAL Jan-May	May	April
				(thousands of dollars)		
Aeronca						
Champion 65 hp	1	--	--			
Champion 85 hp	11	4	1			
Chief 65 hp	1	--	--			
Superchief 85 hp	10	1	3	554	185	169
Sedan	120	39	38			
7CCM a/	63	25	19			
Beech - Bonanza	119	35	26	1,093	325	243
Bellanca - Cruisair	25	6	2	133	33	10
Cessna						
120	5	1	2			
140	38	1	10			
140A	17	17	--	2,294	413	579
170	254	59	76			
190	7	2	2			
195	88	7	18			
Engineering & Research						
Model E	4	1	1			
Model G	22	6	4	83	23	16
Luscombe						
8A	33	6	11			
8F	85	31	21	355	94	73
Sedan	14	1	1			
Mooney - M-18L	20	10	7	36	18	13 b/
Piper						
Cub Special	145	34	40			
Supercruiser	1	--	1			
Family Cruiser	20	1	1			
Vagabond	29	6	7	1,435	429	319
Clipper	260	129	82			
Stinson	96	9	5			
Ryan - Navion	130	17	49	1,080	142	408
Taylorcraft						
BC12D-85	10	3	4			
BC12D-65	4	1	--	26	8	6
Texas Engineering						
Swift	25	5	11	84	17	38
TOTAL	1,657 c/	457	443 c/	7,173 c/	1,687	1,874 c/

a/ Military type aircraft sold to other than U.S. Military customers.
b/ Calculated by AIA. c/ Revised to include Mooney.

CHART reports shipment of personal aircraft by all manufacturers during the month of May

Aircraft Shipment Report

Eleven personal aircraft companies reported shipment of a total of 457 personal aircraft in the month of May, Joseph T. Geuting Jr., Manager of Personal Aircraft Council, AIA, has announced. This shipment includes 305 four-place airplanes, 142 two-place planes, and 10 single-seaters. Figured at manufacturers net billing price, this amounts to $1,687,000. See chart *(below).*

Bonanza Prop Control

Flight Research Engineering Corporation of Richmond, Virginia, announced recently that CAA approval had been received for the Flight Research Automatic Control for use on Beech *Bonanza.* This governor converts the standard manually controlled propeller of the *Bonanza* to constant speed assuring constant engine rpm regardless of turbulence, power setting or attitude of aircraft.

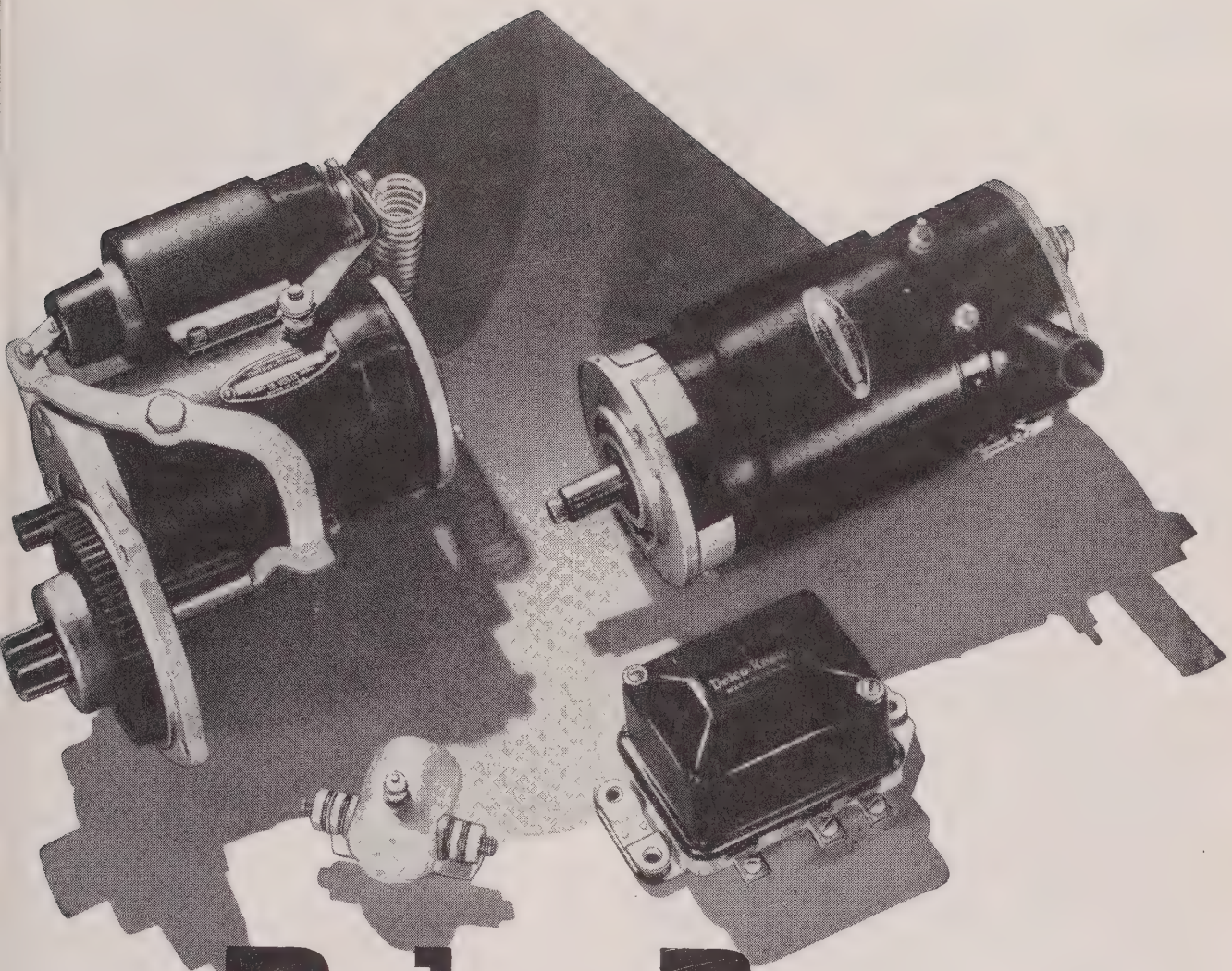
Flasher Lights--Personal Plane

A new and improved type of blinking mechanism for position lights on personal and executive aircraft operating at night has been marketed by Van Dusen Aircraft Supplies. Manufactured by Airlectron Inc., of Caldwell, N. J., the blinking mechanism, called BLINK-R, brings added safety to personal-plane night operations. This system has been developed to meet latest CAA specifications for blinking position lights which have been found to be more easily seen from other planes than the steady position lights currently used on private and executive aircraft. The BLINK-R unit weighs 22 ounces installed and may be mounted in any convenient place along the plane's electrical system for the position lights. The BLINK-R is set to flash "on" for a period ranging from .6 to 1 second, and to flash "off" between .3 and .5 seconds, the variation depending on the voltage supplied by the aircraft battery. A noise filter is provided as standard equipment for suppression of radio interference.

New Radio for Personal Planes

The General Electric Company has come through with a new radio communication unit for private planes. This unit features not only the usual low frequency transmitter but also a VHF transmitter with six channels. According to engineers, when one signal fails to establish contact due to atmospheric disturbances, topographic interference, etc., the signal from the other transmitter has a good chance of getting through.

Known as AK-50, the new GE communication package also includes a two-band low frequency receiver for broadcast reception, navigational range signals, weather reports and tower communication. The receiver is pre-set at the tower tuning position. By moving a switch, the pilot can change from a radio-range frequency to the tower frequency without changing the setting on the main tuning dial. Other features include a built-in interphone system and a noise limiter to facilitate reception through heavy static which formerly made radio contact impossible.



Delco-Remy

Aircraft Electrical Equipment

You can count on enjoyable flying hours with Delco-Remy electrical equipment. Delco-Remy units assure convenient electric starting, ample current for lights, radio and accessories. Delco-Remy builds efficient, dependable electrical equipment for all popular makes of personal planes. *It is available at reasonable cost.* Delco-Remy Division, General Motors Corporation, Anderson, Indiana.

DELCO-REMY—WHEREVER WHEELS TURN OR PROPELLERS SPIN

Memo from

AIRPORT DEPARTMENT
PRATT & WHITNEY
AIRCRAFT

To: Executive aircraft operators

Private plane owners

Fleet operators

The AIRPORT DEPARTMENT of Pratt & Whitney Aircraft, with its extensive facilities, is available to all operators of Pratt & Whitney engines and Hamilton Standard propellers. Repair and overhaul service is as excellent in method and personnel as that of the original factory production.

Here is why:

★ Only Pratt & Whitney or Hamilton Standard factory-made and warranteed new parts are used.

★ Only factory-trained technicians touch your equipment.

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Division, United Aircraft Corporation
Rentschler Airport
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PROP WASH

Aero Oddities

Empty Plus. Pilot on delivery flight in Piper J-3 became lost, flew around for almost an hour before spotting an airport. Pilot landed, then taxied up to gas pump for both fuel and information. Attendant filled plane's 12-gallon gas tank, found he'd pumped 12.3 gallons, and explained to startled pilot that ship's lines and strainers must have taken extra three-tenths of gas. *(S. Pattchett, Jr., Valier, Illinois)*

Good to Last Drop. Flaring out for landing at airport on small island off coast of Central America, pilot winged past sign which read, "One-Fourth." Further down strip, another sign read, "One-Half," and still further down, pilot passed sign reading, "Three-Fourths." As pilot braked plane to a stop at end of strip, he spotted fourth sign which read, "That's all, Brother!" On other side was straight 200-foot drop into the Pacific. *(A. Schworer, Boston)*

Bee Bop. Instructor climbed out of *Cub* after ride with student, instructed him to go ahead on first solo. Student gunned engine, took off, only to find cabin of plane suddenly swarming with bees. After quick circuit of field, student brought ship in, made nice landing despite his passengers with built-in hypodermics. Investigation showed bees had built nest in tail of ship, then been unseated by student's not too smooth landing with instructor aboard. *(T. W. Neumann, Lincoln, Nebraska)*

Duck Down. During war, two fighter pilots, on leave from combat operations, went aerial duck hunting in one of the outfits L-5's. When 12 gauge shotgun jammed, man in rear seat placed gun on floor intending to fix the jam. The gun accidently discharged, severed ship's main spar, causing L-5 to set down in shallow water. Pilots escaped without injury, but ship had to be retrieved, overhauled. It was flying week later. *(J. Creed, White Plains, N. Y.)*

Restricted Information. In England in 1946 very well-known flyer from U. S. was asked to pilot first jet plane on an aircraft carrier take-off. When operation was accomplished, officials warned flyer the feat was military secret and no mention must be made of it. Few weeks later, pilot returned to U. S., went to dinner at fashionable hotel. During dinner show session, feature entertainer at hotel dining room introduced the flyer to others assembled in room, and described flyer as "man who recently flew first jet fighter off carrier." Startled flyer later asked entertainer where she'd picked up that info. Came her reply, "I just saw it . . . at the newsreel theatre around the corner." *(E. H. Church, Woburn, Massachusetts)*

Come Again, Please. An airline passenger dashed into ticket office in California city, asked if limousine for flight to New York had left yet. Ticket girl calmly replied limousine was still outside door, so man rushed out. Two hours later, same man reappeared at check-in counter. In complete resignation he announced he had just had two-hour tour of city . . . and "what do I do now?" *(A. J. Johnson, Oakland, California)*

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

A N N O U N C I N G

The Spartan FLIGHT ENGINEER Course

This Spartan developed Trainer simulates the operation of four engine aircraft.

At the right rear sits a Flight Engineer responsible for the performance of the aircraft in flight.

The new Flight Engineer Course, now offered by Spartan, was designed to fill the serious need of commercial airlines for men of increased skill. Because of the rapid development of large complex aircraft, the airlines and operators of heavy aircraft require many men trained beyond the requirements for the C.A.A. approved Aircraft and Engine Mechanic Certificate. This course was designed to give the airlines a more useful employee and the graduate greater possibilities of advancement.

Spartan has developed a trainer which simulates the operation and cruise control of four-engine aircraft. This sensational new trainer makes it possible to simulate conditions in flight that are not practical during training in a real airplane. For example: the accidental feathering of all propellers on take-off, loss of oil pressure in four engines, fire in fore and aft compartments and many others.

Whether your ultimate goal is that of Flight Engineer or Maintenance Mechanic, this course will make you a more valuable employment prospect with airlines or major aircraft operators. It offers an interesting and well-paid future to young men who can qualify through ability and training. Spartan can give you that training. Write for complete details and for the special folder on this Flight Engineer Course.

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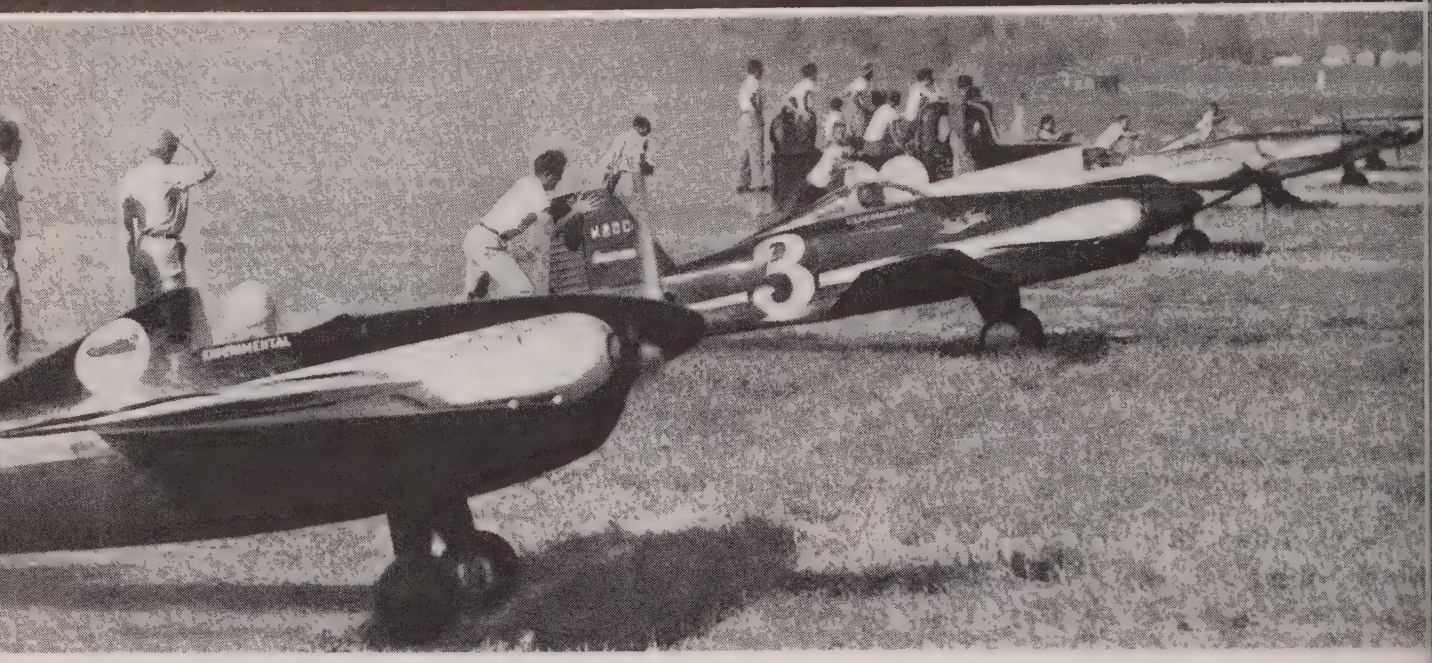
National Air Races – '49



RACE-HORSE GET-AWAY, as used here by midget-plane racers at Newhall, Calif., will be used in Bendix Race this year. Take-off will be from Rosamond Dry Lake near Muroc Air Force Base. In previous years planes took off separately

By TONY Le VIER

Pres., Professional Race Pilots Assn.

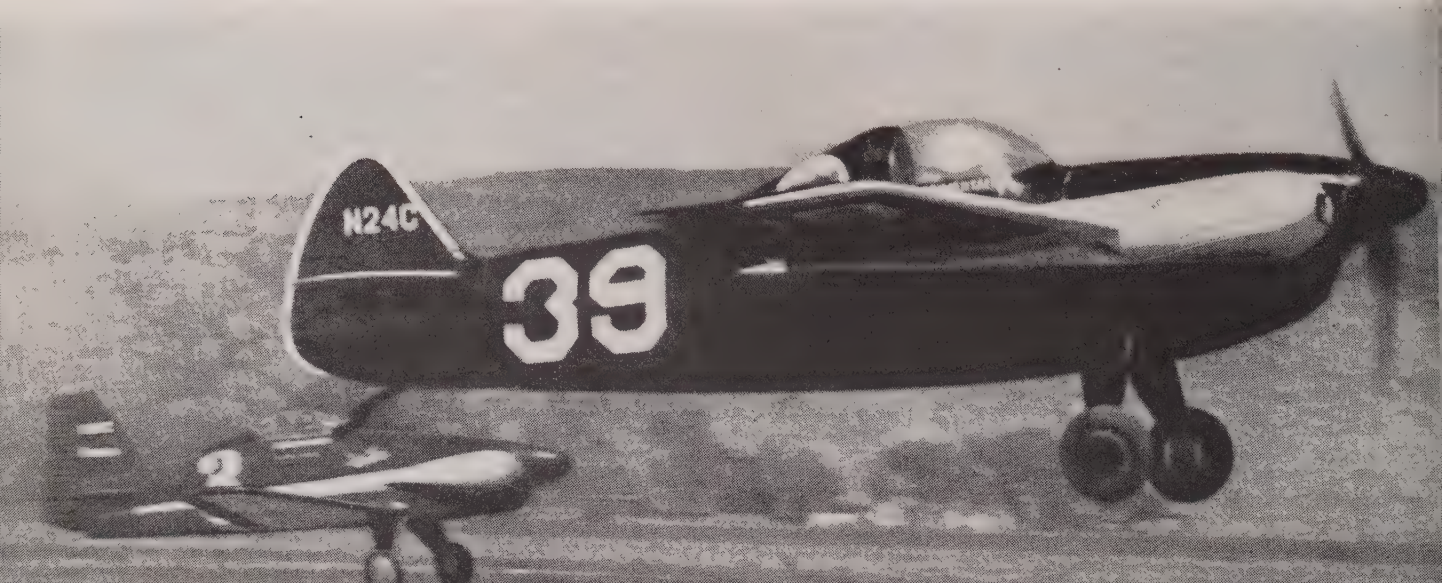
THIS may be the last year for the big, war-surplus planes at the National Air Races.

The reason for this demise is simple—they're too expensive for the average pilot to keep, and "angels" like Glen McCarthy and Jimmy Stewart are getting few and far between.

Actually, I'm sure that the ticket-buying public will be much better off when these heavy, super souped-up F-51's and *Corsairs* have flown their last competitive race. We've dreamed up something now that should make a much better show, but the final details won't be concluded until after the races this year.

The nearly 300 pilots and plane owners of the Professional Race Pilots Association hope to convince the Thompson people to sponsor a 500 cubic-inch open event, similar to the old Greve Trophy Race. This proposed event would include proven 185-hp six-cylinder engines now

MIDGET RACERS getting away in a race-horse start provide extra thrills for spectators. Keith Sorenson flies # 39



CHECKERED FLAG drops as Bob Downey, flying Glen Faulkerson's "Ballerina" finishes first in air race at Newhall

found in *Navions* and *Bonanzas*. We would like to permit retractable landing gears, any type of propeller and a minimum of 80 square feet of wing area. Visibility and structural requirements would be comparable to the current Goodyear standards. These ships would run on a five-mile course built around six pylons to take the "bitterness" out of the turns. Top speeds should be about 300 mph in this class.

Naturally, we hope that this new class of Thompson planes can be promoted. It will give both backyard designers and regular aircraft factory men a great challenge in designing new ships. This competitive design for racing always results in both civilian and military advancement in plane design and construction.

Take the old Schoenfeldt *"Firecracker,"* a Keith-Reider racer that I flew in 1938 and 1939 to win the Greve race. It would trim any existing military plane at that time, but I never had it wide open long enough at any one time to establish a straightaway record. The 550 cubic-inch Menasco *Buccaneer* engine developed 550 horsepower at 72 inches of manifold pressure.

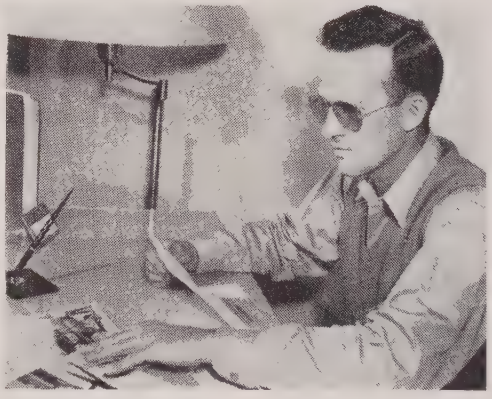
Many of the innovations on the *"Firecracker"* were later developed for many modern fighters of World War II. Actually, the *"Firecracker"* flew a lot like a *Mustang*, even if it was a mighty tiny airplane by comparison. It carried 90 gallons of fuel and had a wing span of only 18 feet with

RACE WINNER of long standing Steve Wittman is a school teacher when he isn't bending his ship around the pylons

MOVIE STAR Jimmy Stewart owns the *Mustang* that his pilot Joe De Bona flew to a new transcontinental record

just 65 square feet of wing area.

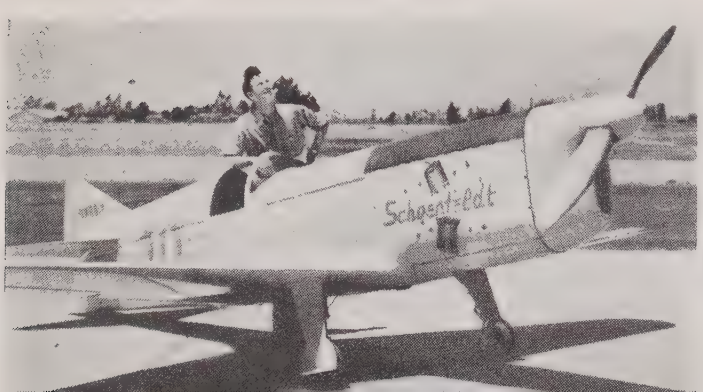
The new set-up on the Bendix cross-country race this year is swell. It should have been done long ago. This year the race will be run with a race-horse start from the broad surface of Rosamond Dry Lake near the Muroc Air Force test base. The cement-hard five-mile-wide surface will make it possible for the cross-country competitors to take off all at the same time without risk. Last year, as in the years before, Bendix contestants were given separate take-off times, and each entrant was clocked from his particular take-off time to his landing-at-Cleveland time. With this new race-horse get away system, the spectators in Cleveland won't have to buy a newspaper on their way home from the races to find out who won and in what time. With all planes taking off at the same time, the first plane across the finish line is automatically the winner.



AUTHOR Tony Le Vier is a test pilot for Lockheed, and president of Race Pilots Association

As an added point of interest in the Bendix dash this year, pilots will be required to check in by radio with the CAA stations at Colorado Springs, Goodland, *(Continued on page 49)*

KEITH-REIDER *"Firecracker"* was the ship Author Tony Le Vier flew to victory in Greve Trophy Race in '38, '39



WISCONSIN'S race pilot Bill Brennand won the Goodyear Race a couple of years ago in Wittman's *"Wittman Special"*

HELMET TROUBLE . . . PILOT STYLE

USAF PILOT Robert L. McCulloh called it an "emergency," pulled away from his flight . . . and learned a good lesson

Normal cruising for an F-47 is 230 mph but this pilot could only get 180 . . . why?

By ROBERT L. McCULLOH

EVERYONE pulls a good boner once in a while. Sometimes it is embarrassing, other times only amusing. While flying the P-47 *Thunderbolt* (now F-47) at Sweetwater, Texas, I pulled the granddaddy of them all. The passing years have dulled the humiliation I once felt concerning this incident, and now I laugh whenever I happen to think about it.

It was during night flying, and I was finally ready to take off on a cross-country mission. The first two planes which had been assigned me were unfit for flight—one had a dead generator and the other had not been refueled—and on the plane I'd just started one of the fuel pumps was not functioning. I was so disgusted at the delay, which had already allowed my flight to take off 10 minutes ahead of me, I didn't go back to operations and demand another ship. Instead, I taxied out.

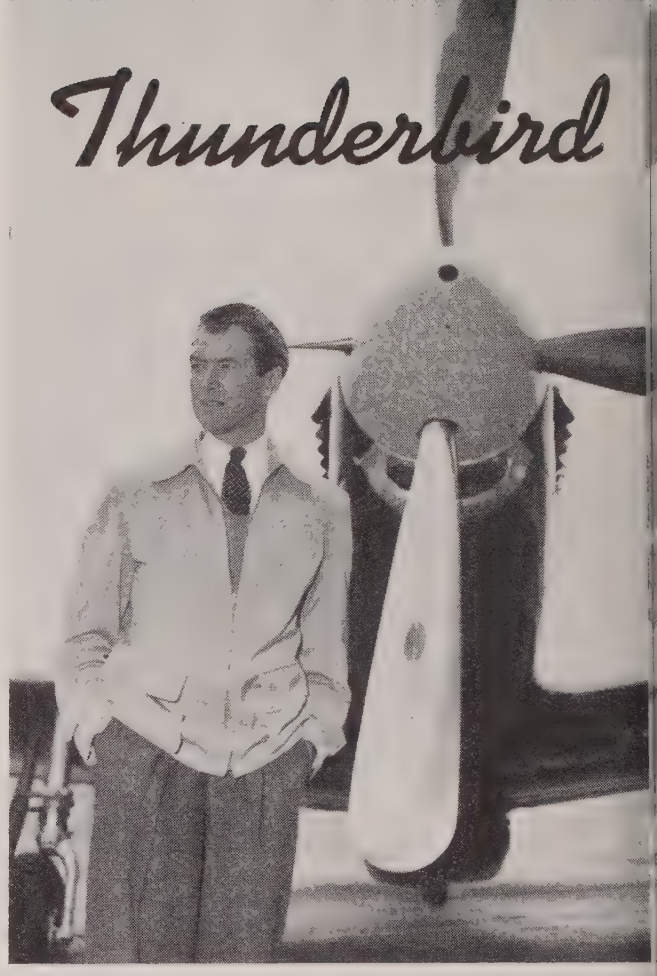
On the way out to the end of the landing strip, I looked back to the side and discovered that my fuel was "siphoning" out of the air vent in the cap. It cost five more minutes to break the steady flow of gas, and when at last I reached the end of the runway, mine was definitely the last ship to hit the black.

As I climbed to 7,000 feet where the rest of my flight was impatiently circling, I meditated on my various misfortunes. By the time I had leveled off at the specified altitude, I was quite bitter. "Oh, well," I thought as I looked around for the lights and red-hot exhausts of the other three planes, "it's all okay now. Nothing more to worry about." *(Continued on page 45)*

Thunderbird

In 1942 when Jimmy Stewart went into the Air Corps, he was a private. At war's end, he was a Colonel . . . . and not of the desk variety. Jimmy Stewart won his up in rank the hard way, via combat missions, just as countless others did. Today, film star Stewart is still actively interested in airplanes, and especially high-speed ones. One of his proudest possessions is "Thunderbird," an F-51 which Stewart plans to enter in this year's Bendix Trophy Race.

FILM STAR Jimmy Stewart has been busy getting his F-51 ready for the Bendix. Here he pulls covers off the ship



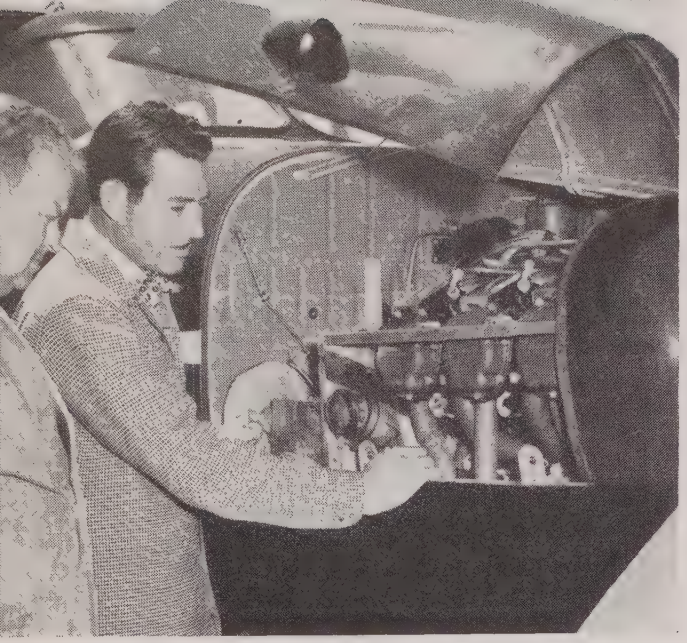
BENDIX RACE will find Jimmy Stewart's *Mustang* one of the ship's entered. Pilot may be well-known Joe De Bona

TRIAL RUN coming up, Stewart hitches the Jeep tow truck *(left)* to the *Mustang* preparatory to towing the sleek ship out of the hangar. That's Stewart at the controls of the tow truck *(below)* towing the F-51 out to runway

ASSING UP is another job Jimmy Stewart takes care of mself *(above)* at Clover Field in Santa Monica, Calif.

TANKS FULL and ship ready to go, Jimmy puts chocks behind F-51's wheels while he waits for De Bona to show up

ILOT who is to fly ship in this year's Bendix Race is oe De Bona, who flew the "Thunderbird" to unofficial trans-continental record of 4 hours 59 minutes. Here Joe *(in cockpit, below)* gets final word from plane's owner



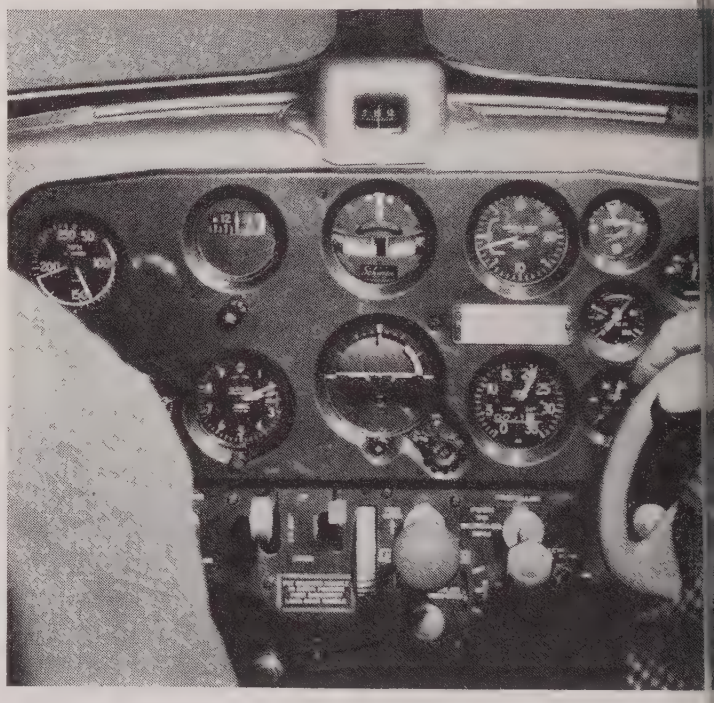
AIRPORT MANAGER Williams looks on as Doc Sloan inspects *Navion's* new muffler. Note air scoop on open cowling

rovia Airport, to accompany us on this SKY-WAYS pilot report trip. Mr. Williams owns one of the first 30 *Navions* to come off the production line at North American and was in an excellent position to appreciate the 1949 refinements installed by Ryan.

The weather was dreary and drizzly in the Los Angeles basin as we climbed into Mr. William's old *Navion,* NC91130, and headed for San Diego; 47 minutes later we taxied into the parking area at the factory.

Dapper Doc Sloan, Assistant to the Vice President of Ryan and former Commanding Officer at the Thunderbird Air Force training school in Phoenix, Arizona, wheeled his Royal Maroon

NAVION panel looks like this, except for gyros which are extras. Note 140 mph at 2100 rpm, 23 inches manifold



By DON DOWNIE

Now it's the *"Navion-A".* The alterations in the new *Navion-A* have really been refinements rather than any design change. Adding 20 hp to the Continental engine is probably the greatest change, but the accumulation of little improvements make the new "A" model an even better airplane than its predecessor.

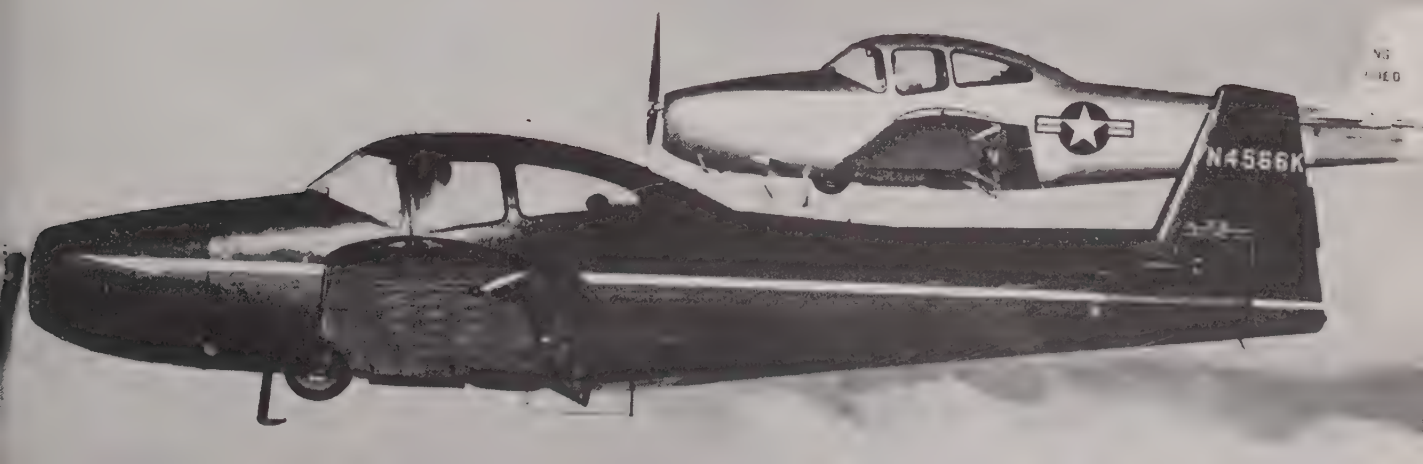
Actually so many changes were made in the new model *Navion* that the CAA required all new 1949 ships to carry this changed designation. Over 50 airplanes had already left the San Diego factory with the old registration, so a service letter was mailed to the new owners notifying them of the change.

In an effort to find out just how much better this new *Navion* is than its older "brother", we invited King Williams, manager of the Mon-

PATTERN into San Marcos was high, so Downie dumped full flaps while airspeed was 95 mph. Deceleration was fast

PILOT'S REPORT... New Navion

RYAN NAVION FOR 1949 is powered by new 205-hp engine which gives the plane a cruising speed of 155 mph

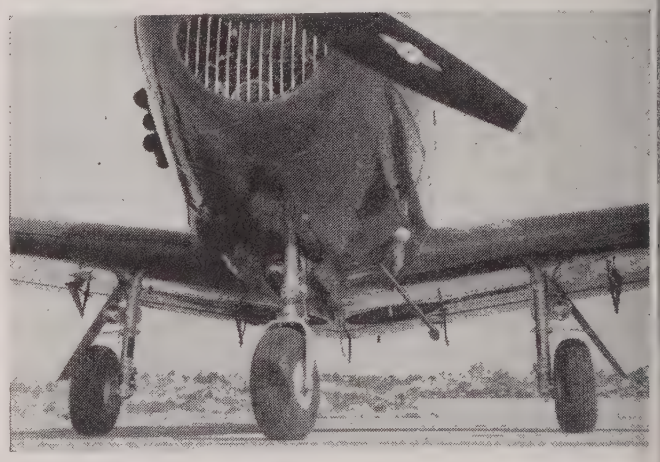


NOSE SHOT of runway at Lindbergh Field was made from the *Navion* on its final approach to San Diego field

demonstrator, N4566K, out of the hangar. This ship had about 100 hours on its log books at the time of this flight and was a stock model except for gyro instruments, a recording tachometer and an all-metal Hartzell propeller.

"Is there any place around here that offers a sort of backyard air strip so we can try out the rough-field performance of this ship?" we asked as Doc showed us the alterations on his new plane.

"I have just the place for you, and it isn't out in the country very far," grinned Sloan. "Betty Gillies and her husband have the Rancho Del Cielo' right up here on the edge of town. They have a little dirt strip right alongside their house and I just received permission yesterday to use it in demonstration flights. I haven't



GEAR doors and fairing have been added to clean up air flow of *Navion* in flight. New gas cap cover cuts drag

NAVION N4566K was picked up at Ryan's factory for this pilot's report. Note Lindbergh Field off the wing tip

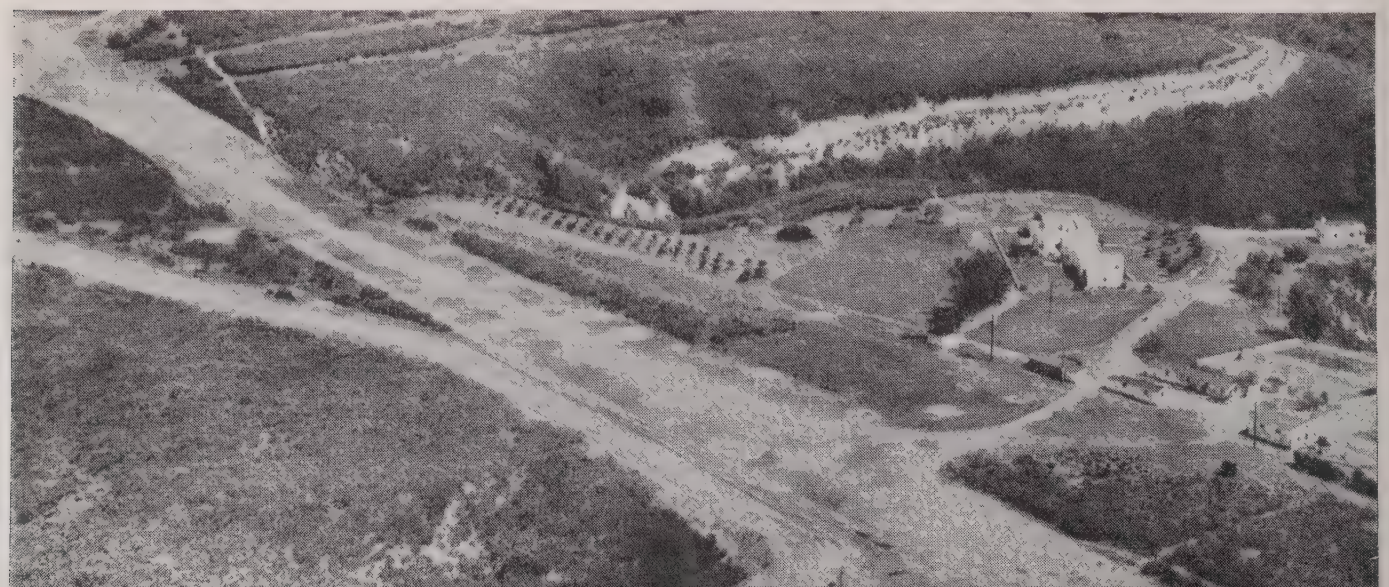
landed in there yet, so if you'd like, let's go." (Oh Brother—what an airport that turned out to be!)

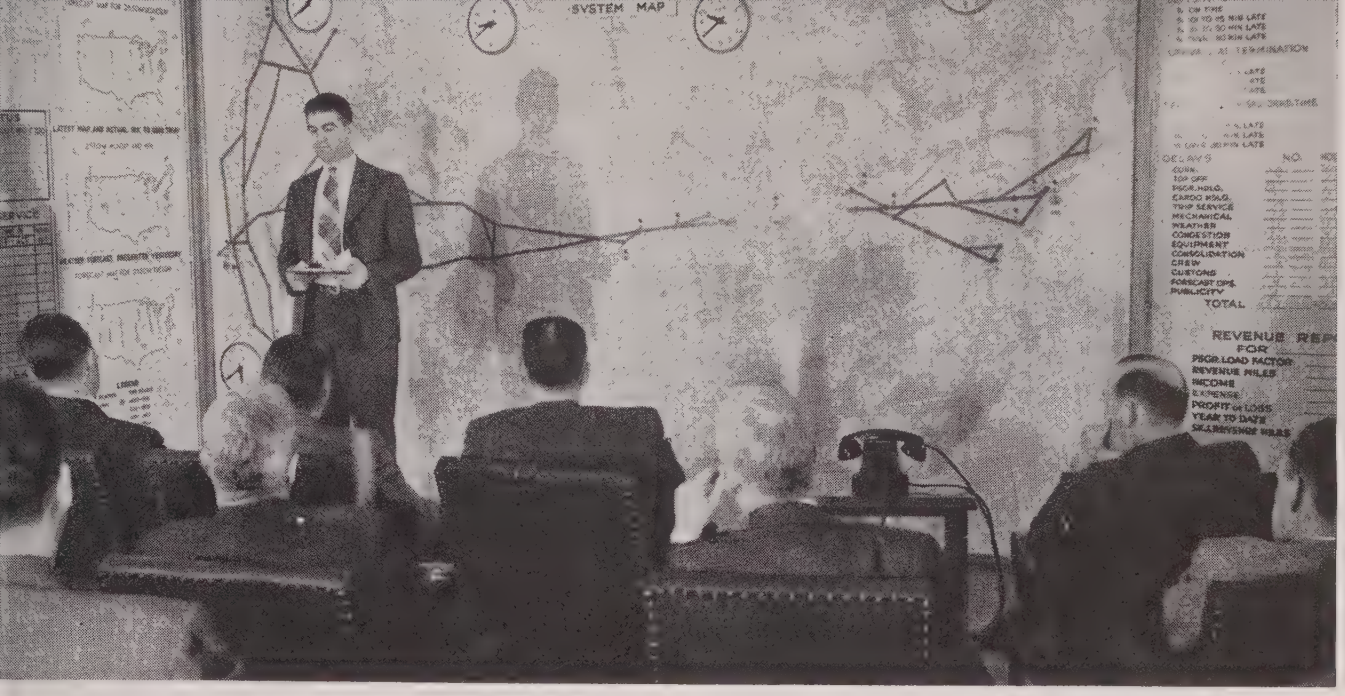
Before climbing into the plane, Doc Sloan showed us some of the exterior changes on the new ship. A ram-air scoop on the right side of the cowling provides air for ventilation and the new much needed exhaust manifold heater.

"It is actually a whole lot of little things that make the new *Navion* a better airplane," said Sloan, "—little things like this handle on the hydraulic tank make inspections a cinch without a wrench."

Hangar owners will be happy with Ryan's new antenna system *(Continued on page 43)*

ROUGH-FIELD performance of new *Navion* was tested at Rancho Del Cielo'. Note hump in runway upper left of photo





FLIGHT MANAGERS at UAL's Denver Base begin day with a session with meteorologist. Lights on map tell weather along routes

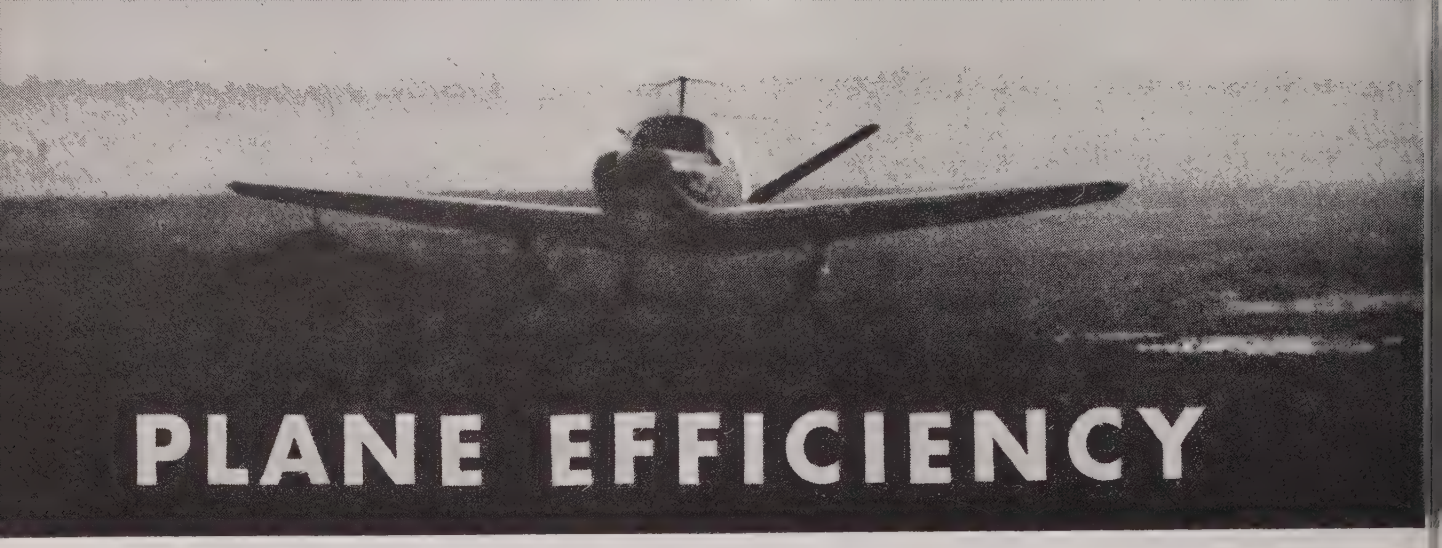
ROOM WITH A VIEW

THERE's a room in Hangar 5 at Denver's big Stapleton Airfield where the lights shine the night around.

It's a smallish, ordinary appearing room, aside from wall charts, clipboards and an abundance of telephones. Yet lack of prepossession is no measure of its importance. It's the control center for the aircraft of United Air Lines, the operations of which extend from Hawaii across the Pacific and the continental United States to New England, and north to British Columbia.

Day and night, flight dispatch managers of the company keep in contact from this room with other flight centers at key points along the 10,700-mile system, coordinating the advance routing as well as the mile-by-mile progress of airliners in flight. Managers at the Denver Operating Base can work directly with directing operations of aircraft, but the function is actually more supervisory—keeping watch, seeing that the threads of the far-flung operation are always tight. Their main concern is four-engined equipment, Mainliner 300's (DC-6's) and Mainliner 230's (DC-4's), al- *(Continued on page 62)*

DISPATCH CLERK Glen McNutt marks hourly weather reports with colored crayon so that weather can be seen at a glance



PLANE EFFICIENCY

MAXIMUM UTILITY in aircraft operation means using that plane from dawn to dusk and, if it's equipped properly, to fly it at night and through most weather. Here, Bill Odom brings his "Explorer Jr." into airport after X-C

By BILL ODOM

Photos by Bill Price

PLANE efficiency is a lot of little things. Take for instance the problem confronting us when we sat down to figure out how to make a Beechcraft *Bonanza* fly from Honolulu to Teterboro, N. J.

We ended up considering everything from how shiny the metal skin was, to the temperature of the gasoline stowed in the tanks.

BY
CK
DATE 3-1-49

MODEL
BEECH AIRCRAFT CORP
WICHITA, KANSAS

Aerodynamic
REPORT
PAGE

GROSS WEIGHT =2800 POUNDS

RPM = 1750

ALTITUDE	MP	GAL/HR	MILES/GAL	I.A.S.	T.A.S.	
4000'	16.7	5.43	19.55	99.9	106.2	
	17.8	5.82	20.08	109.8	116.8	
	19.0	6.47	19.70	119.5	127.3	
	20.9	7.25	19.02	129.4	138.0	
	22.8	8.18	18.20	139.3	148.7	
	25.0	9.30	17.12	149.0	159.2	
8000'	16.7	5.83	19.34	99.9	112.8	
	17.8	6.23	19.90	109.8	124.0	
	19.2	6.92	19.55	119.5	135.3	
	21.2	7.78	18.84	129.4	146.7	
	--	--	--	--	157.9	
	--	--	--	--	169.2	
12000'	16.8	6.25	19.23	99.9	120.1	
	17.9"	6.70	19.70	109.8	132.1	
	--	--	--	--	144.2	
	--	--	--	--	156.2	
	--	--	--	--	168.2	
	--	--	--	--	180.2	
						67 gals
		Start	25kts		for T.O	

11,000' per mountains 1 Estimate for T.

CHART, taken from cruise control book Odom used on record flight, indicates setting for maximum efficiency

Some of the devices we used to stretch the "Waikiki Beech" into a trans-Pacific plus a trans-Continental airplane don't have much relation to ordinary private flying. Installation of wing-tip tanks, for instance, obviously isn't a practical solution for the private-plane owner. Other items on our list designed to improve miles-per-gallon performance, however, do have a direct application to efficient lightplane operation in general. The most important of these was a series of pre-flight studies that I hope will eventually point the way to a new type of pilots handbook. These studies developed into a set of power curves and charts that I used as a quick, handy reference to indicate optimum efficiency of the plane under all the flight conditions that I encountered.

These charts were worked out from bench tests of the engine at the Continental factory in Muskegon, Mich., and later from extensive flight tests at the Beech factory in Wichita, Kansas.

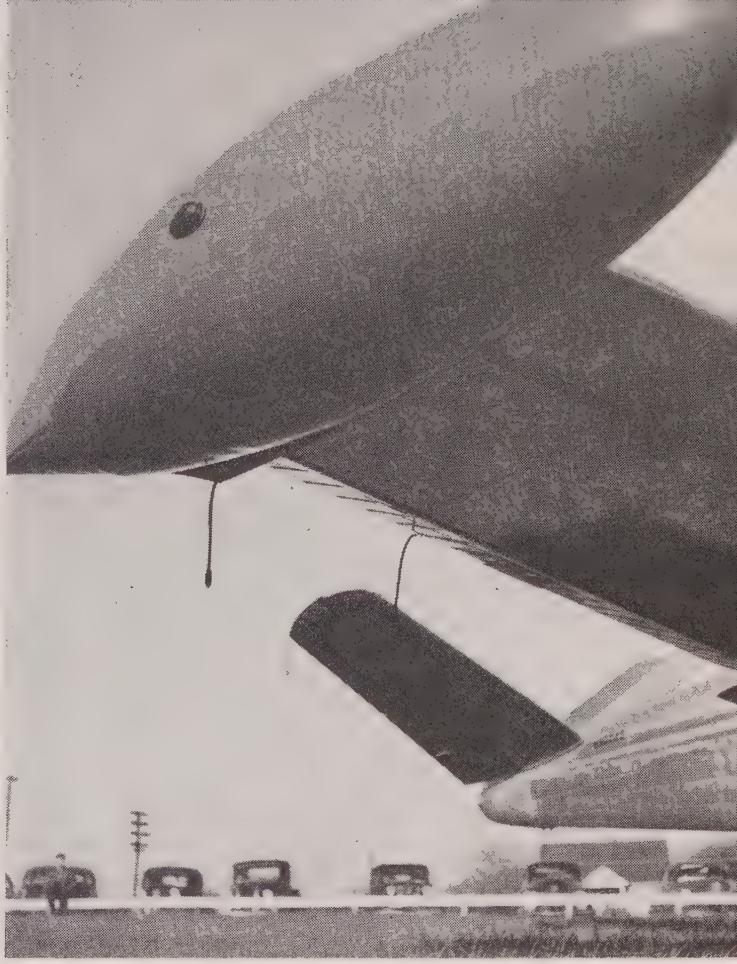
Compiled in a neat, paper-bound 15-page booklet entitled "Long-Range Cruise Control Data," the information became my "Bible" for the entire hop. It was so comprehensive and handy, as a matter of fact, that it became my log book as well. All I had to do was underline my choice of the recommended settings listed, and note the time which they were used, and I had a complete log of what the plane was doing.

Similar handbooks could be worked up for all private planes. They would certainly be the greatest boon ever thought of for pilots who otherwise have no way of judging the most efficient combination of:

1. Gross weight; 2. Altitude; 3. RPM's; 4. Manifold pressure; 5. Gallons per hour; 6. Miles per gallon; 7. Indicated air speed, and 8. True air speed.

WING-TANK installation, Odom shows on model, was made in conformity with best long-range cruise angle of attack

PLASTIC CONE houses Odom's Lear ADF loop. This installation cuts out drag set up by external tear-drop housing



TESTS made following first Hawaii to N. J. flight showed wing tanks were not installed at best angle. For second trip angle of attack was changed three degrees. Pilot Gearhart *(left)* gets "lesson" from Bill on cruise control

I used the data, of course, to establish what you might call "maximum range cruising" conditions.

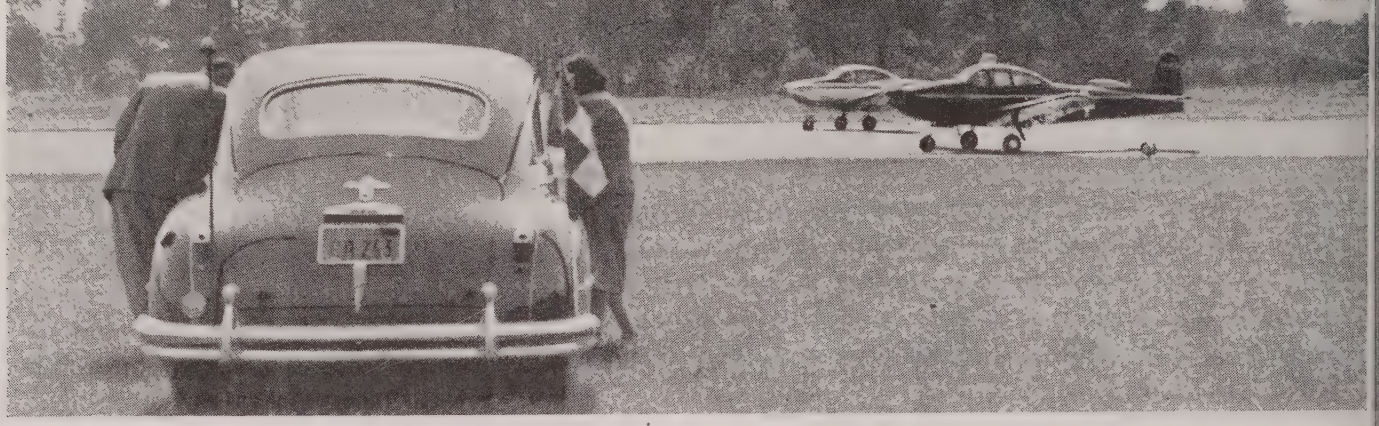
The same data, differently interpreted, however, could establish the best settings for maximum endurance, in case you're in the stack or waiting for an overcast to dissipate beneath you. Or it could give you maximum speed settings for a given fuel supply, etc.

I get kind of excited when I think about the possibilities of these charts, because they were such a godsend to me on the Honolulu-Teterboro trip.

To illustrate what they mean, one of the pages I flew by is reproduced with this article *(page 24)*. A little further on, I want to explain how this particular page was used in flight.

Before getting into that, though, let me mention a lesson involving a different kind of efficiency I learned from two other airplanes, one a P-47 with a slick paint job and the other an A-26, streamlined with cellulose tape.

I got interested in the P-47 with the idea of racing it. The NACA *(Continued on page 46)*



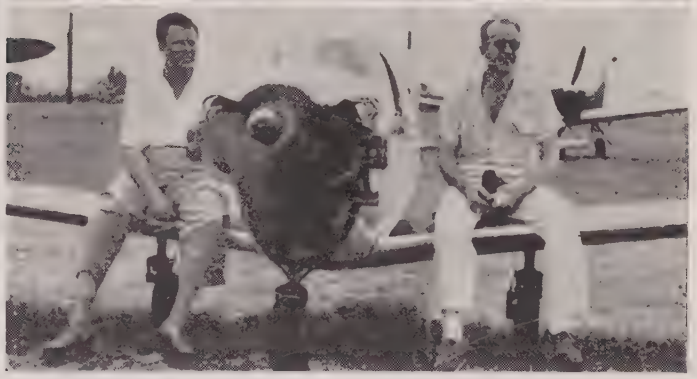
Ninety-Niners' Air Meet

MONTREAL-MIAMI race called for a stop at Westchester Airport, N. Y. Planes in race were handicapped according to advertised cruising speed. In photo here, two *Navions* get away in a race-horse start. Next stop — Miami, Florida

THE third annual All-Women Air Show, held each year at Miami, Florida, gave the public a good bit of racing and aerobatics recently. The Air Show featured five races: The San Diego to Miami race, won by Loretta Foy and Sue Kindred in a Piper *Clipper;* the Montreal to Miami race, won by Peggy Lennox in a Cessna 140 (Time--12 hrs., 23½ mins.); the AT-6 race (5 laps, 27.5 miles), won by Kay Landry (Time—9 mins., 22 secs.); A race for 75- to 125-hp planes (4 laps, 15.2 miles), won by Peggy Lennox (Time—8 mins., 50½ secs.); and race for 65-hp planes (4 laps, 15.2 miles), won by Helen McBride (Time—8 mins., 55 secs.).

WINNER of Montreal to Miami race Peggy Lennox accepts congrats of Mrs. Coconaugher *(left)* who raced against her. Before each day's races, contestants were pre-flighted. Lone man in the picture is CAA's Beroset

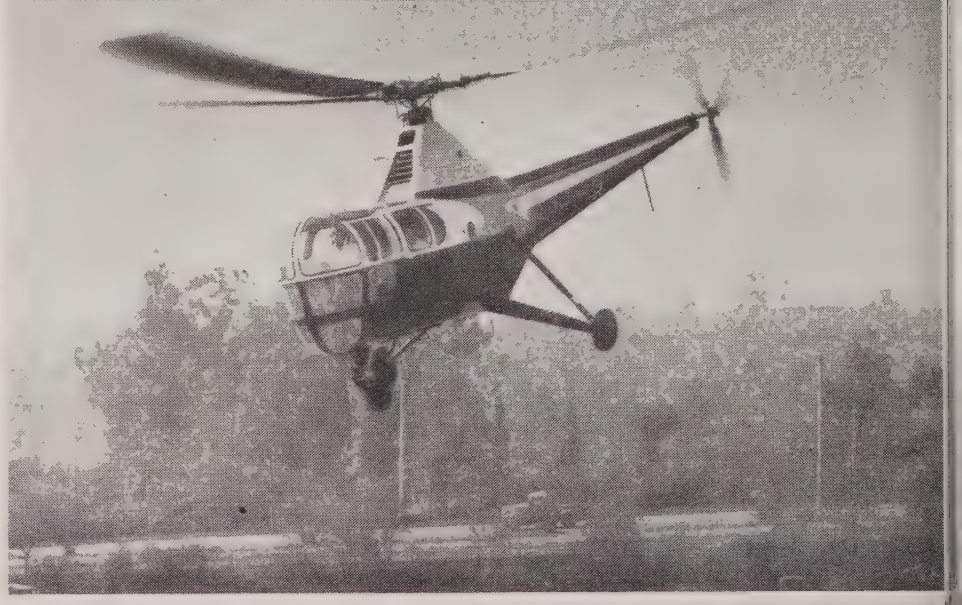
FEATURE of the Miami Air Show was a stint of precision glider flying done by diminutive Caro Bayley *(above)*. Peggy Lennox *(below)*, a two-race winner, put on a crop dusting, banner pick-up and towing demonstration



GROUND OFFICIALS were gals, too. While they worked, visiting airmen sat by and wondered and worried. Trophy awarded to non-contestant who flew greatest distance to attend show went to Cocile Maurer *(below)* of Tulsa, Okla.

TROPHY TAKER in the closed-course race for 65-hp planes was Mrs. Helen McBride in a Mooney *Mite (above)*. Her sponsors, Mooney dealer and distributor, are the men on the wings. Zack Mosley *(below)* was chosen "Aviation's Man of Distinction"

POGO-STICK AIRLINE



HELIOPORT for L.A. Airways' 'copters is a 150 x 200-foot plot near South Pasedena

By DON ARMSTRONG

A LANDING every 10 minutes — that's their schedule.

They never get over 50 miles from their home base and they don't carry passengers, but they do deliver airmail to 4½ million people in Southern California.

Approaching their third year in business, Los Angeles Airways now delivers mail directly to 44 cities not previously serviced by direct airmail. There are over 75 "satellite" post offices who gain time indirectly by this service.

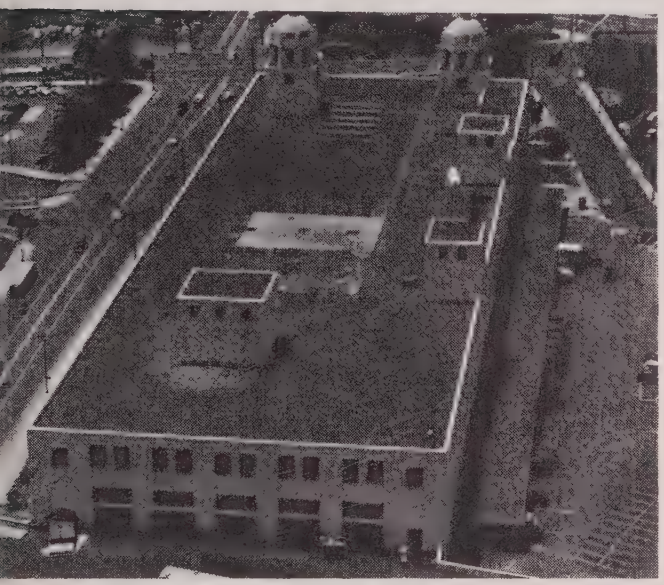
Even inter-city suburban airmail has become popular and loads are so heavy that their five Sikorsky helicopters had to be modified, one at a time, to handle more cargo. This West Coast outfit undoubtedly will be the model for other short-haul airmail routes contemplated in Chicago and New York.

The sprawling suburban communities sur-

TEST LANDING of AF 'copter in front of Pasedena City Hall proved crowds unmanageable, so South Pasedena site was chosen

rounding Los Angeles are ideal for helicopter service. Surface transportation on overcrowded streets is slow and real estate is too expensive for more close-in conventional flight strips. Without the helicopter, the mail would go through by truck.

Schedules on this 'copter mail delivery, first to be authorized in the United States by the Postal authorities, are keyed to the home-delivery mailman. Landings at the 39 "heliports" are scheduled at the last possible minute to make the home delivery deadlines. For example, mail off-loaded from a transcontinental flight at

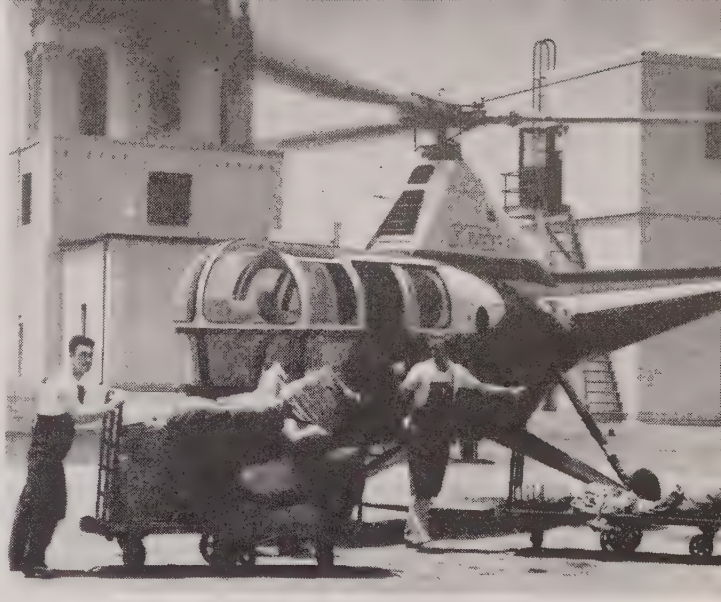


POST OFFICE landing field for 'copters (18 a day) is light-colored area seen atop Los Angeles P. O. Annex

the Los Angeles Municipal Airport by 5:30 in the morning will go out on one of several early morning helicopter flights and be delivered to homes or offices before noon in towns as far away as San Bernardino, 50 miles from the Post Office Annex in downtown Los Angeles. High-speed service of this type was formerly restricted to a small section of the downtown metropolis.

According to a Civil Aeronautics Board report, "the use of helicopters speeds up delivery of mail as much as 4½ to 19 hours on week days and as much as 24 hours over week-ends and holidays."

Original experimental flights to prove the utility of the helicopter for this operation were made by Army pilots of the March Field Search and Rescue Unit over a month-long survey. Now three routes totaling 356 route-miles are flown three times *(Continued on page 50)*



POSTAL employees load mail aboard 'copter atop Post Office Annex for flight to towns within operating radius of 50 miles. Flight by 'copter from airport to P. O. takes 11 minutes; by car it would take an hour

STAMP COLLECTORS spent $4,535.80 for stamps for first flight of L. A. Airways. Mail covers numbered 90,716

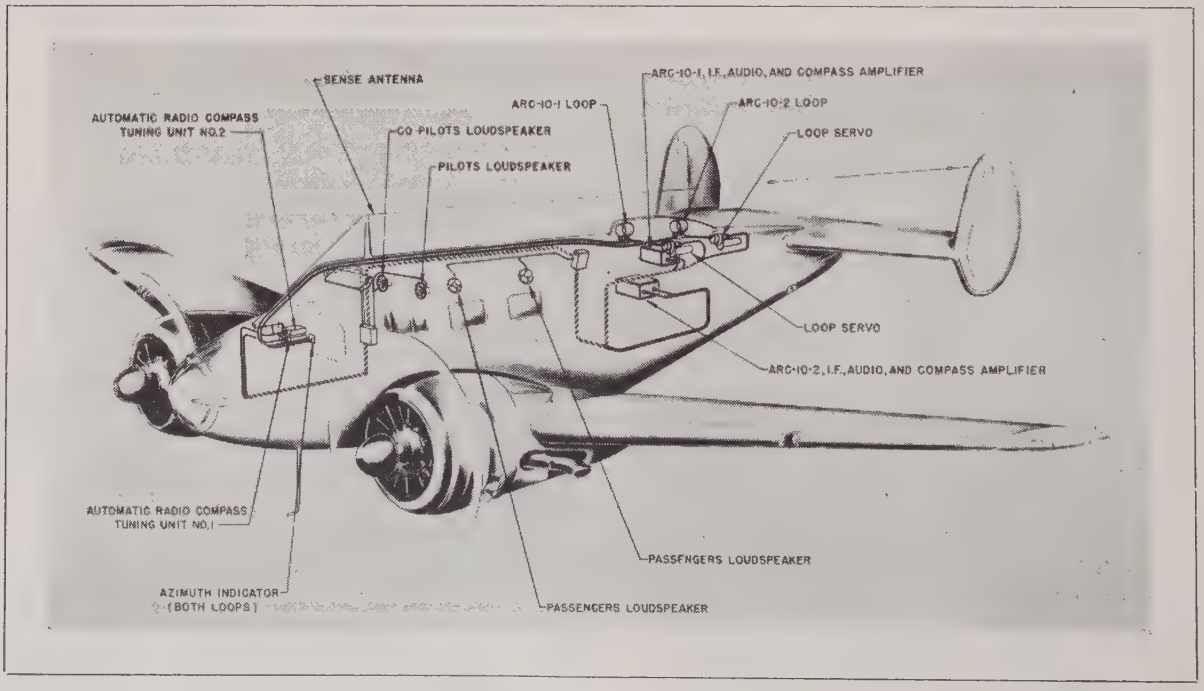
Using Your ADF

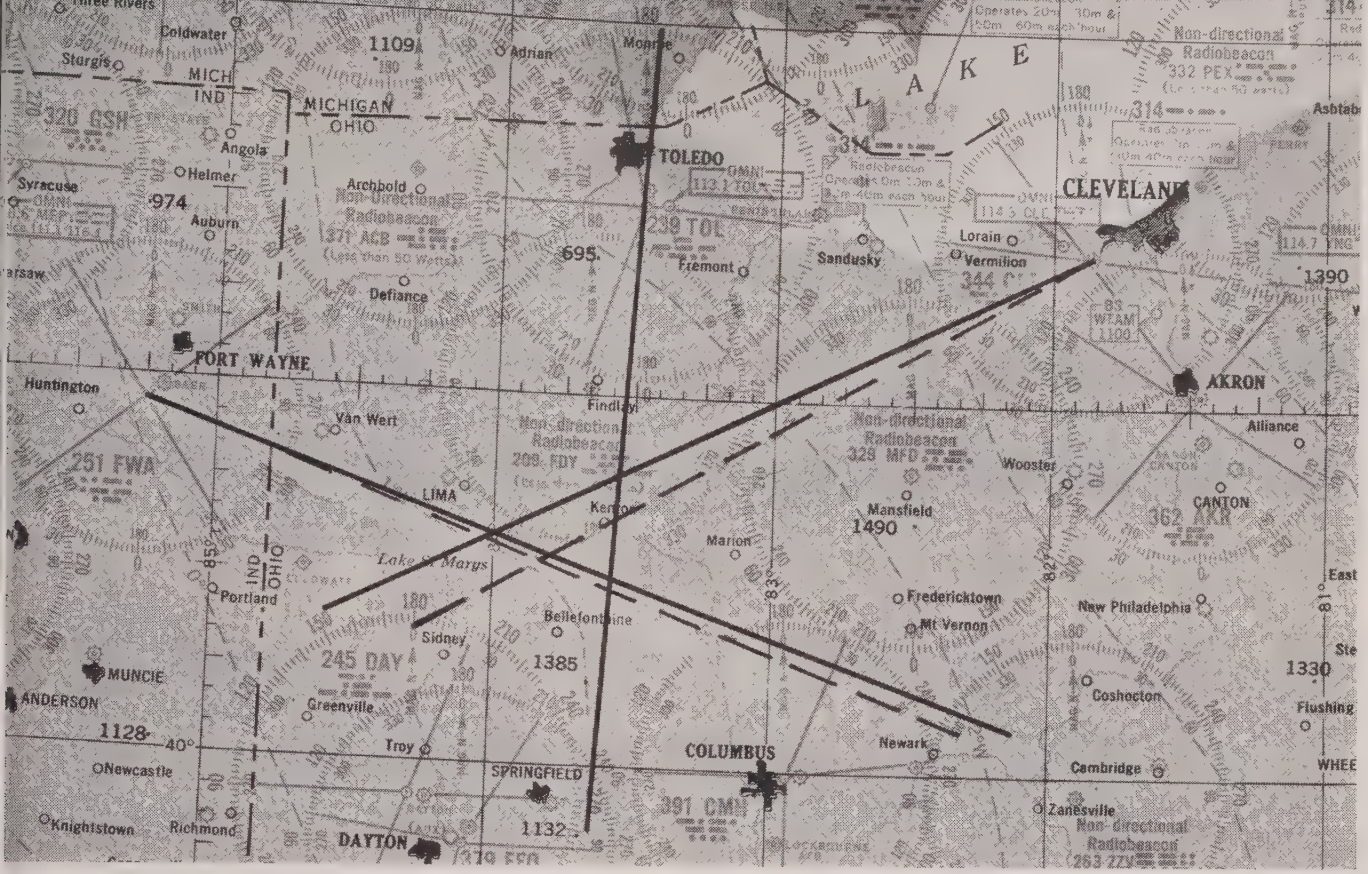
By BEN ROBIN

PART of the CAA exam for an Airline Transport Rating covers loop orientation and let-down procedures. Most private pilots will never need or want an ATR. However, a working knowledge of navigation and position-finding by radio compass receiver will prove helpful on any cross-country flight.

In addition to the ADF receiver itself, you need a set of six ADF maps which cover the entire United States. These are Lambert Conformal Projections and are better suited for radio bearings than the sectional or regional charts because of the compass rose drawn around each range station. An up-to-date

ADF INSTALLATION for a *Twin-Beech* is shown here in this "cutaway" drawing. Type installed is the Lear dual ADF





PILOT flying XC over Ohio plots his position on chart 23 DF. He tunes in three stations, TOL, CLE and FWA, then draws in three bearing lines. His position falls within small triangle. Dotted lines are corrected bearings

list of standard broadcast station frequencies and call letters is another must. This list (White's Radio Log) is available at most newsstands.

Standard broadcast stations generally use more power than range stations and are therefore audible at much greater distances. A broadcast station like WLW, Cincinnati, Ohio; WCBS, New York; or WBT, Charlotte, North Carolina, will provide a good bearing as far out as 200 miles. It can be flown until the local radio range buils up in volume sufficiently strong for accurate bearings. If there is no radio range near your destination, the broadcast station can lead you all the way.

Only the easiest type of radio navigation is familiar to most private pilots using a radio compass receiver.

They tune in a range or broadcast station on the ADF, then swing the ship's nose around gently until the azimuth compass needle points to zero or 360°. That places the station directly on the nose and there is nothing to do but home straight to the station. Of course, if any cross wind is blowing, the track over the ground will resemble William Tell's bow, but eventually the ship will pass over the station, headed into the wind. The correction for this situation is quite obvious. A crab angle into the wind must be established to correct for drift. If the needle swings to the left of zero degrees, your ship is drifting to the right, so a correction to the left

SAMPLE WORK SHEET

For	Steer	For	Steer
N	1	S	180
30	32	210	208
60	63	240	238
E	92	W	269
120	122	300	300
150	151	330	330

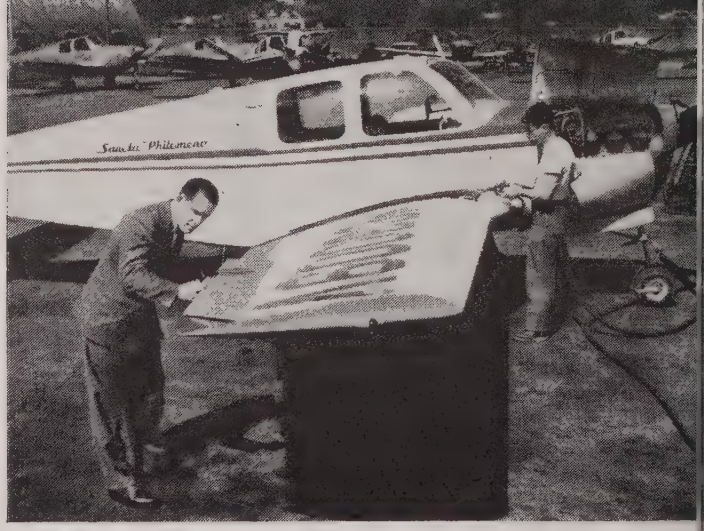
Station	Freq.	Compass Heading	Magnetic Heading	Relative Bearing
TOL	239 kc	146°	145°	221°
CLE	344	144°	143°	281°
FWA	251	146°	145°	144°

Variation Correction	Convergence Correction	Corrected Bearing
0°	0°	6°
plus 3°	plus 1°	68°
0°	minus 1°	288°

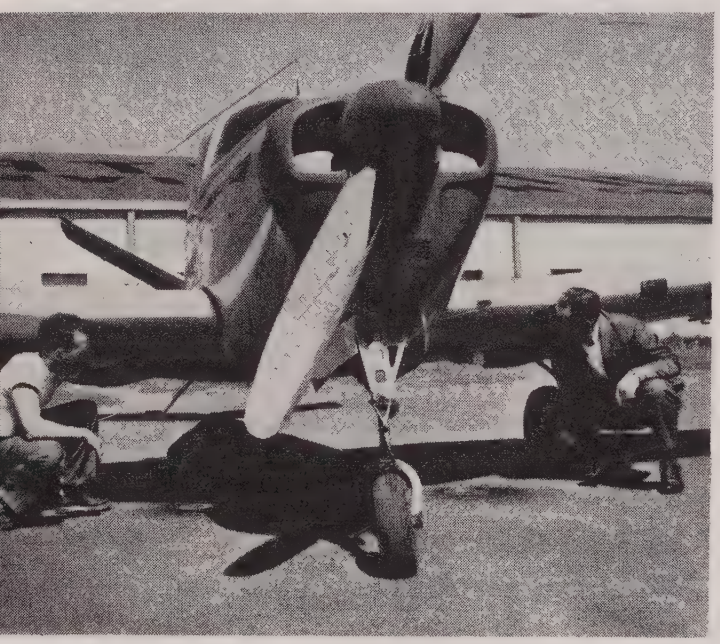
is needed. I usually try 10° then add or take off as required. Your track will be a straight line when the azimuth needle remains constantly on one point. The degrees between zero and that setting is also your drift angle (approximately).

If you are flying a range leg on one receiver and your ADF compass is used as an auxiliary visual check, it will show the drift angle automatically. *(Continued on page 51)*

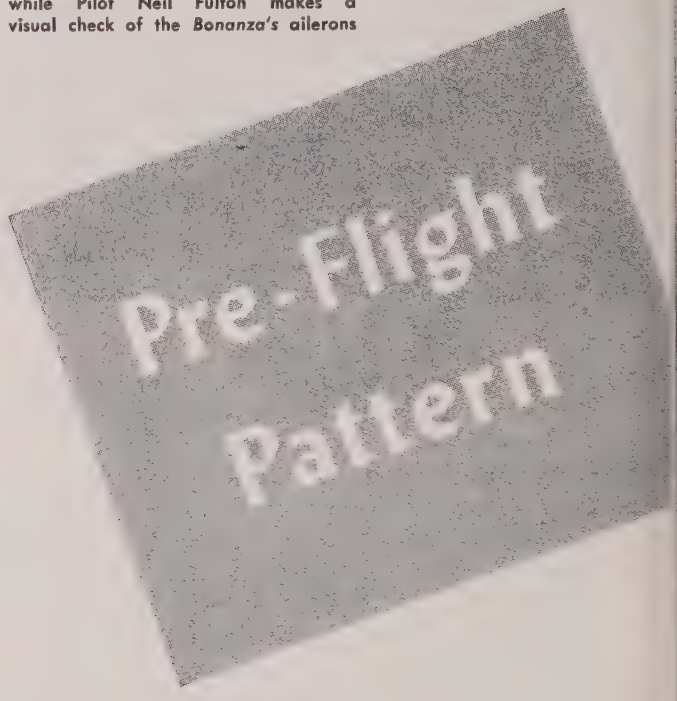
PRE-FLIGHT procedure to assure perfect operation of aircraft calls for close check on gas and oil: 40 gallons of 80 Octane for full tank, and eight quarts of SAE 40



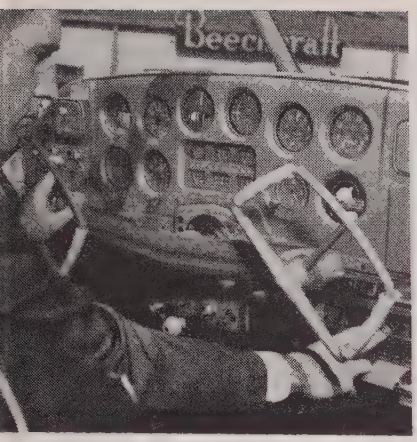
MECHANIC tops the gas tank while Pilot Neil Fulton makes a visual check of the *Bonanza's* ailerons



SUMP drainage is another task to remember. This clears water from the ship's tanks *(above)*. Pilot must also make sure gas cap is secure, tires inflated to 28 lbs



RADIO reception is important in flight. To make sure everything's okay, Fulton checks his antenna



PLANE'S circuit breakers are checked before Fulton starts *Bonanza's* engine

LAY-OUT of the *Bonanza's* panel is shown here in this photo of Fulton setting the altimeter, another important pre-flight item to remember

FULTON also checks movement of controls to be sure there's no binding

ODAY's aircraft and engines are so well built that with only routine care and consideration, they give owners thousands of hours of perfect operation. Under the heading "Routine care" comes the all-important pre-flight check. Following these recommended checks, the plane owner assures himself of successful flight and low-cost operation. Demonstrating the recommended cockpit procedure for the Beech *Bonanza* is Neil Fulton, formerly Chief Pilot for Atlantic Aviation at Teterboro, N. J.

The man who owns an airplane guarantees his investment by following the builder's recommendations . . . in this case, the pre-flight.

GEAR UP, manifold pressure at 25 inches HG; 2050 rpm, the Beech *Bonanza* climbs at between 70, 100 mph

ENGINE warmed up at 1200 rpm, cowl open, mags checked, Fulton calls tower for instructions. For take-off he'll use 'Full Rich' mixture, no more than 29 in. HG

Fly Baby

By DR. RALPH NETZLEY

with Ruth Downie

AUTHOR Dr. Netzley is shown here holding Dana, daughter of the Don Downies

DANA, just eight months old, gets some flying time in a Ryan *Navion* while sitting on her pilot pappy's knee

CO-AUTHOR Ruth Downie *(below)* flew with daughter Dana when she was few weeks old

BABY GEAR packed in small duffel bag, this wee one waits to be put aboard Piper *Clipper* for family X-C

UNITED AIR LINE'S Capt. Gil Sperry and Mrs. Sperry take their nine-weeks-old son on air trips in a club *Swift*

Good heavens! You're not going to take your baby up in *that* little plane!" exclaimed the grandmotherly matron as I climbed up on the wing of the Beech *Bonanza.*

"Why not?" I asked. "That's the way we came, and I'd certainly hate to leave her here in Death Valley."

The idea of flying with a six-month-old infant was obviously such a shock to this well-meaning spectator that I took a minute to explain why it was all right for a baby to fly right along with the grown-ups.

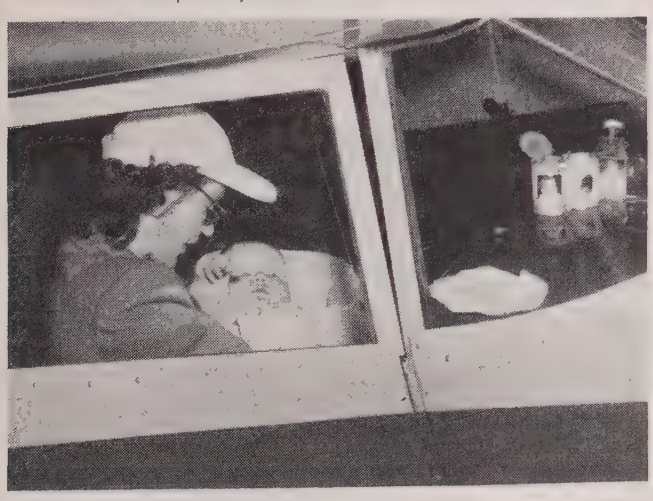
"It's almost 300 miles from here to Los Angeles over hot, winding desert roads," I explained "Even an expert driver will take over seven hours by automobile, but we'll be on the ground within an hour and a half. There's no heavy jolting or traffic stop-and-starting and the baby will be in her own bed within two hours."

From a medical standpoint, there is absolutely no reason why a normal infant should not fly. As long as the youngster has not been sick or had a recent cold, he can fly at the lower altitudes without any trouble.

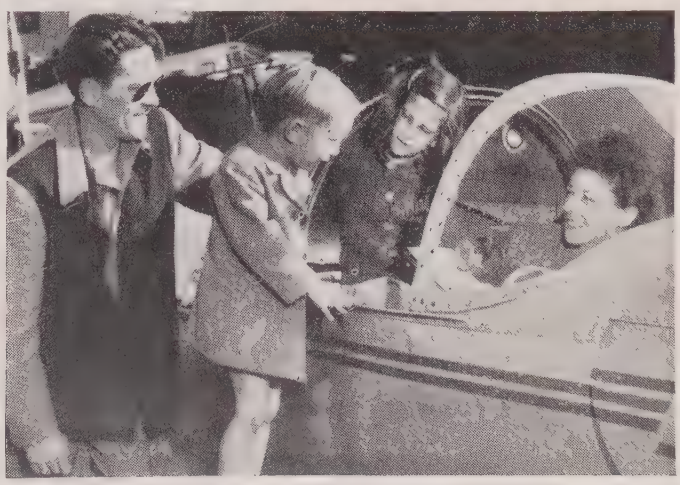
Actually, flying is the best possible means of transportation for a small infant. While the airlines frequently carry infants only a few days old, many baby specialists tell their patients to keep their youngsters on the ground for the first two months. After that, parents can take them right along if they keep down to a reasonable altitude. Anything below 10,000 feet will not hurt a normal healthy infant.

The older the child, the more altitude he can take without trouble. At two years, a normal youngster can make *(Continued on page 52)*

FLYING PARENTS find it easy to take along baby food. Some keep baby food in one thermos, milk in another



ERCOUPE OWNERS Jack and Caroline West have plane fixed up to permit their taking their two children on air trips



"Confucius Dilbert even confuses the other guys!"

DILBERT

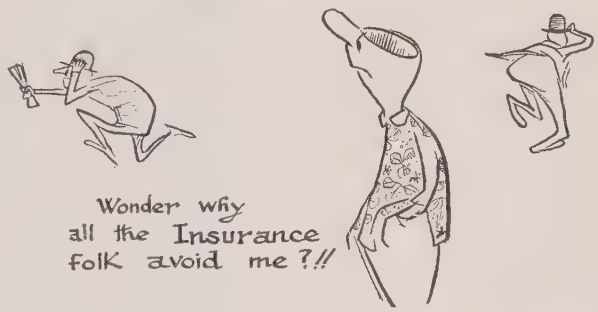
By Seth Warner and Robert C. Osborn

A Bad Risk—Here's a good example of why accident insurance for aircraft comes high. A few hours after Dilbert got his airplane out of major overhaul, he set out on a 500-mile X-C.

At about the half-way mark, he ran into some weather. He only had VFR clearance, but did he land or turn back? Not Dilbert. He nosed right on in, and was forced to climb steadily to avoid mountains in the area. Fortunately, he broke out on top, but shortly thereafter experienced partial engine failure. Fortune still attended; Dilbert was able to get down through a break in the overcast and make a successful landing at an airfield nearby.

Any normal pilot would have been sobered by this experience and, at least, have had an engineer check into the cause of the trouble; but not Hotshot Dilbert. He gave the engine a ground run-up, and when this appeared satisfactory, he took off again. Only this time Dame Fortune didn't go along.

On his second leg, Dilbert flew through some scattered showers, and again his engine started cutting out just as he broke into the clear. The engine wouldn't supply sufficient power to maintain altitude, and finally quit cold at 200 feet. A pretty fair full-stall landing in a rocky creek bed, with flaps down and wheels up, enabled Dilbert to walk away from the wreck.



Subsequent investigation disclosed that the airplane had come out of overhaul with no anti-moisture compound on the terminals of the spark plug leads. This condition permitted the terminals to collect some of the moisture through which Dilbert had flown, thereby causing the engine to cut out.

Of course, Dilbert kept pointing at this negligence as the cause of the accident. But it didn't clear him for not *(Continued on page 58)*

Operational Engineering

Service Notes: Cessna 140

For the guidance of those who fly, service or are otherwise interested in the operation of personal or executive aircraft, SKYWAYS has gathered together helpful lubrication instructions, service facts and figures and general tips on U. S. aircraft.

The Cessna 140, in both 85- and 90-hp versions, is one of the most popular two-place, side-by-side aircraft flying today. Given proper care and attention the Cessna 140 is worth its weight in utility.

Ground Operations--Routine Servicing

Fuel tanks: The Cessna 140 has two 12½ gallon fuel tanks, one in each wing, with direct reading fuel gauges in the cabin roof. The fuel is transferred to the carburetor by a gravity-feed system through a three-position fuel selector valve, providing a right-tank and left-tank position and a shut-off for both tanks. *Important:* The fuel valve *handle* indicates the setting of the valve by its position on the selector dial.

Fuel Strainer Drain: Located on the firewall in the engine compartment, it is fitted with a spring-loaded drain valve that is opened with a quarter-turn. After draining water on pre-flight allow drain to snap closed to insure positive seating.

Oil System: The Continental C-85 engine oil capacity is four and one-half quarts, serviced on the right side of the engine. Quantity is checked by means of a marked dipstick attached to the oil tank filler cap. The C-90 has a capacity of five quarts.

Brake Hydraulic System: The master cylinders for the single, disc self-adjusting brakes are located at the rudder pedals and incorporate reservoirs for brake fluid which should be kept full at all times with AN-VV-O-366 petroleum base hydraulic fluid, or its commercial equivalent. Whenever the brakes feel spongy, bleed trapped air at the top of the actuating cylinder at the brake and re-fill the reservoir at the pedal.

Landing Gear: The single tapered chrome vanadium steel leaf spring forming each main gear requires no maintenance other than painting to prevent rusting.

Tire Inflation: Main landing gear tire pressure for the 6.00 x 6 tires is 16 lbs; tail tire is solid.

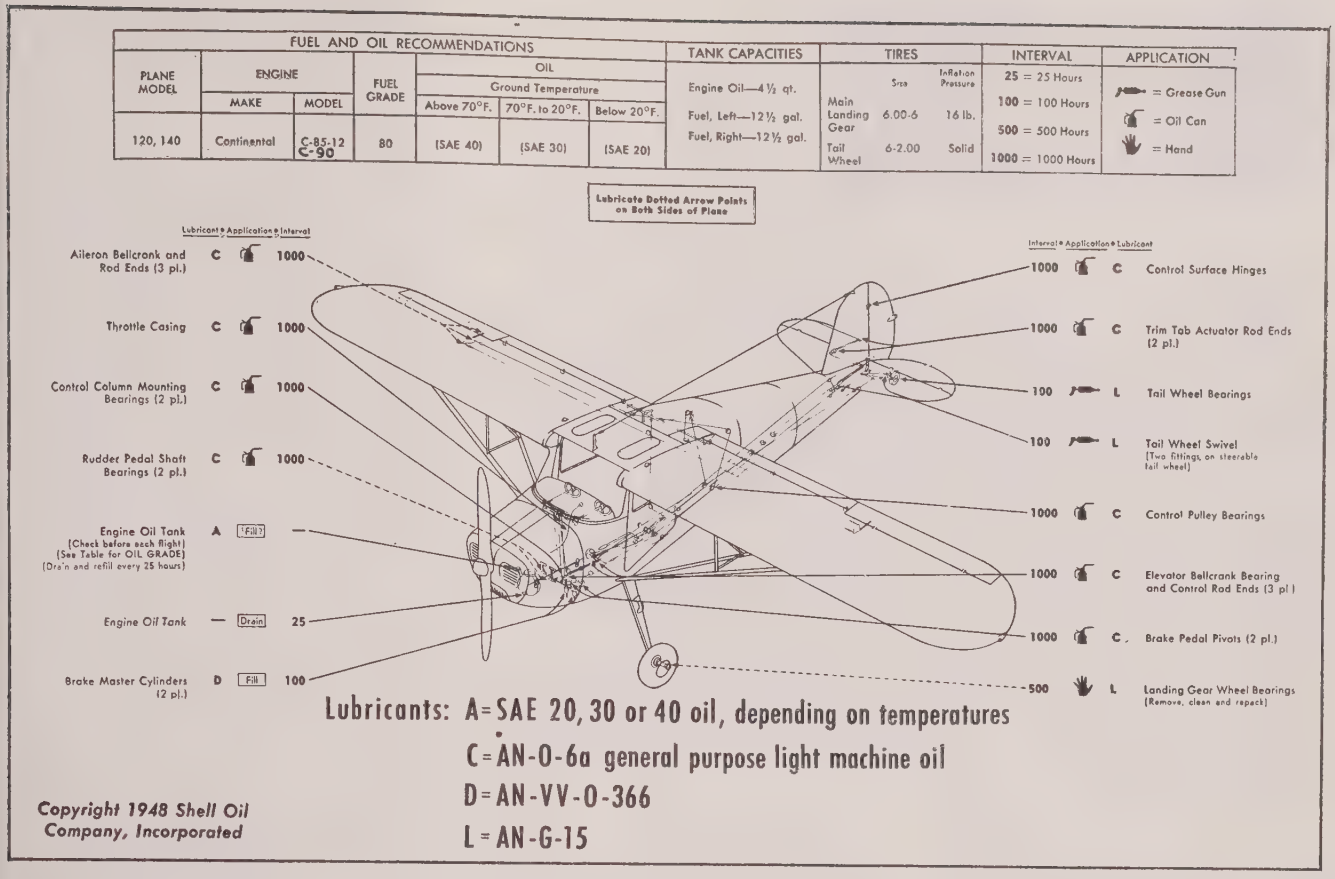
Main Wheel Alignment: The main wheels should toe in one-eighth to one-quarter-inch when the airplane is in the three-point position. Alignment is accomplished by the use of wedge-shaped shims at the wheels and has been properly set at the factory on new aircraft.

Battery Servicing: The 12-volt, 24-ampere hour Reading R24L battery is located behind the baggage compartment and is reached by unfastening the snap fasteners holding the fabric partition. The electrolyte level in batteries having a horizontal baffle plate should not be higher than flush with the plate; in other types the level should not be more than one-quarter inch above the separators. These conditions hold when the battery is in a level position. When installed in the 140 in its customary three-point position on the ground the electrolyte will be below the forward quarter of the plate or separators, so care must be taken not to fill the battery above proper level when installed in the plane as it may result in spillage and acid damage to the plane's interior during flight.

General Lubrication: See chart and accompanying list of lubricants and periodic inspections. All roller chains and control cables should be wiped free of dust,

NEW MODEL Cessna 140 *(above)* features a new all-metal tapered wing, and single strut. Larger aileron, flap area adds control, stability. Maximum engine speed for 90-hp model is 2475 rpm

CESSNA 140, 1948 model *(below)* is same as new model except for the wing. Both ships are powered by either 85- or 90-hp engine


FUEL AND OIL RECOMMENDATIONS
PLANE MODEL
ENGINE
MAKE
MODEL
FUEL GRADE
OIL
Ground Temperature
Above 70°F.
70°F. to 20°F.
Below 20°F.
120, 140
Continental
C-85-12 C-90
80
(SAE 40)
(SAE 30)
(SAE 20)
TANK CAPACITIES
Engine Oil—4½ qt.
Fuel, Left—12½ gal.
Fuel, Right—12½ gal.
TIRES
Size
Inflation Pressure
Main Landing Gear
6.00-6
16 lb.
Tail Wheel
6-2.00
Solid
INTERVAL
25 = 25 Hours
100 = 100 Hours
500 = 500 Hours
1000 = 1000 Hours
APPLICATION
= Grease Gun
= Oil Can
= Hand
Lubricate Dotted Arrow Points on Both Sides of Plane
Lubricant • Application • Interval
Aileron Bellcrank and Rod Ends (3 pl.) C 1000
Throttle Casing C 1000
Control Column Mounting Bearings (2 pl.) C 1000
Rudder Pedal Shaft Bearings (2 pl.) C 1000
Engine Oil Tank (Check before each flight) (See Table for OIL GRADE) (Drain and refill every 25 hours) A Fill —
Engine Oil Tank — Drain 25
Brake Master Cylinders (2 pl.) D Fill 100
Interval • Application • Lubricant
1000 C Control Surface Hinges
1000 C Trim Tab Actuator Rod Ends (2 pl.)
100 L Tail Wheel Bearings
100 L Tail Wheel Swivel (Two fittings on steerable tail wheel)
1000 C Control Pulley Bearings
1000 C Elevator Bellcrank Bearing and Control Rod Ends (3 pl.)
1000 C Brake Pedal Pivots (2 pl.)
500 L Landing Gear Wheel Bearings (Remove, clean and repack)
Lubricants: A=SAE 20, 30 or 40 oil, depending on temperatures
C=AN-O-6a general purpose light machine oil
D=AN-VV-O-366
L=AN-G-15
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CESSNA 120 & 140 chart shows points requiring periodic inspection and lubrication to assure efficient and economical operation

sand and grit periodically when operating off dusty runways. When operating along sea coasts, occasionally coat cables with light machine oil corresponding to AN-O-6a General Purpose Oil.

Power Plant--Tips and Tolerances

Engine: For either the 85-hp or 90-hp Continental engines installed in different models of the Cessna 140, see the proper Continental Engine Manual for detailed maintenance and service instructions. Installation in the Cessna is the same for either powerplant except for larger shock mounts for the C-90.

Engine Speeds: The C-85 is limited to a maximum engine speed of 2575 rpm. Engine should idle between 500 and 550 rpm for best operation. Full throttle ground run-up speed with wood prop should be 1900 rpm or more; with metal prop should be 2100 rpm or more. The C-90 maximum engine speed is 2475 rpm for full 90 hp.

Flight Controls--Tension and Travel

Ailerons (Fabric-covered wing 140): In neutral, ailerons should fair with the flaps. Cable adjustments are made by neutralizing bell cranks which restrict the travel. Cable tension is approximately 30 lbs with the control wheel full forward. When the bellcranks and cables are adjusted in accordance with the Cessna Manual, fairing the ailerons with flaps is accomplished by disconnecting the aileron push-pull tube which operates from the bellcrank, and making the adjustment on the rod end. Travel limits are 22 degrees up, 14 degrees down, plus or minus one degree.

Ailerons (All metal-wing 140): The aileron travel on the new all-metal 140 (first deliveries were made in June) is 20 degrees up and 14 degrees down, plus or minus one degree. The location for adjustment is basically the same as on the fabric wing, being through an inspection opening in the wing trailing edge just ahead of the inboard end of the aileron. Cable tension is the same as on previous models.

Flaps (Fabric-covered wing): The flaps, which should be set to fair with the wing, are positioned by two adjustable stops located in the trailing edge of the auxiliary spar ahead of the flaps. Down travel is 40 degrees and adjustment for this is made by changing the turnbuckle in the cable system, located to the rear of the baggage compartment.

Flaps (All-metal wing): The adjusting point on each flap are two bolts in the false spar of the wing just ahead of the flap near the outboard and inboard end of each flap. All-metal wing flap travel is 43 degrees down.

Rudder: Travel is 16 degrees from the centerline of the airplane, plus or minus one degree. Travel and adjustments are controlled by stops and washers on the extreme rear bulkhead.

Elevators: Travel is 20 degrees up and down, plus or minus one degree, controlled by two stops located in the rear spar of the vertical stabilizer. Cable tension is approximately 30 lbs. This applies to all Cessna 140's.

Elevator Tab: Travel is six degrees up and 33 degrees down, plus or minus one degree. Adjustments must be made according to Cessna Manual. Cable tension is approximately 30 lbs.

Rudder Tab: This is a ground-adjustable fixed tab. It may be set for proper trim by bending. Follow this with a flight check to ascertain correct adjustment.

General--

Navigation Light Switch: Early models of the 140 did not have the independent rheostat switch for the panel lights, and the navigation light switch controlled the wing lights, rudder lights and the panel lights. Prior to the installation of the rheostat switch, the instrument panel light bulbs used were Grimes T 3¼-3 CP having a rating of .33 amperes each. The bulbs used with the rheostat are G. E. No. 1826 having a .12 ampere rating. The earlier model Grimes bulbs are not to be used in planes with the rheostat switch since their ampere capacity is high enough to allow the rheostat to get too hot and possibly burn out. The model numbers of the bulbs are marked on the base and as they will both fit the same socket, care must be taken in making sure only the correct bulb is used when making replacements.

Landing Gear Wheel Bearings: Remove wheels and re-pack bearings every 500 hours. When operating off dirt or dusty runways, check the gear every 100 hours for need for re-pack. The wheel axle nut should be tightened ginger tight plus one-half turn when re-installing.

According to the CAR's, all repairs, adjustments and replacements that are other than routine must be made by or under the direction of a licensed A & E mechanic.

None of the information is intended to supersede or replace any directions contained in official manuals or service bulletins issued by the manufacturers.

CAOA REPORT . . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

New Officers of Your Association

At the Directors meeting held on June 29, 1949, two new members of the Executive Committee of the Board of Directors were elected. To bring the members up to date on the various officers of the National Association as well as the various committees, here is the roster of CAOA officers:

Chairman of the Board of Directors: William B. Belden, Assistant Counsel for Republic Steel Corporation, Cleveland.

Directors of the Association: Donald Bixler, Sinclair Refining Co., New York City; Walter Pague, Chief Pilot, Armco Steel Corp., Middletown, Ohio; William Martin, Assistant to the President, Bristol-Myers Corp., New York City; Cole H. Morrow, J. I. Case Co., Racine, Wisconsin; Paul Craig, Chief Pilot, Champion Paper and Fibre Co., Ashville, N. C.; J. C. Jones, Chief Pilot, R. M. Hollingshead Corp., Camden, N. J.; H. L. Maurhoff, Chief Pilot, National Dairy Products Co., New York City; John Dunham, Chief Pilot, United Cigar-Whelan Stores Corp., New York City.

Members of the Executive Committee are: William B. Belden, Chairman; H. L. Maurhoff, Donald Bixler, John Dunham, and William Martin.

The two new members elected to the Executive Committee were Mr. H. L. Maurhoff and Mr. John Dunham.

Members of the Technical Committee are Walter Pague, Chairman; Paul Craig, and John Dunham.

Problems to be handled by the Technical Committee or correspondence to any of the other officers of the Association may be addressed to them care of the Executive Secretary of the Association, 444 Madison Avenue, New York 22, New York.

Suggestion re Official Decals

One member writes in to report that he lost one of his CAOA decals because he applied it over a couple of rivet heads. When he pressed the decal firmly against the metal, the rivet heads broke through the decal film and later in flight the slipstream peeled it off. He suggests members be sure to put the decals on a smooth section of the aircraft's surface—one without rivets, joints or overlaps to prevent a completely smooth adhesion.

As has been suggested before, the ideal place for the decals seems to be under or near the pilot's window of the aircraft where the ground personnel can spot it during parking instructions. The second decal should go near the door where airport employees will notice it during servicing.

Incidentally two of the official decals are on their way to Ethiopia to be applied to an executive *Stinson* of the Sinclair Refining Co., stationed there. Does any member have aircraft further away than Sinclair's *Stinson*?

Use Your F.S.F. Report Cards

The weather forecast report cards distributed to the members for the Flight Safety Foundation are beginning to come in. Your Executive Secretary has seen some of them and the lack of accuracy in some of the forecasts, as compared to actual conditions encountered by pilots, has been appalling.

In some instances 1000 feet had been forecast when the pilots actually found 100-foot ceilings. In other instances "scattered light showers" turned out to be violent thunderstorms that forced the pilot to make an emergency landing with damage to the plane.

These cards are returned to the U. S. Weather Bureau for investigation by authorities and it is hoped such action will result in better forecasts for all of us. Obtain extra cards from headquarters.

Indoctrination for Executive Pilots

Cole H. Morrow, new member of the Board of Directors, points out that the flying of corporation officials presents some particular problems on the part of the pilots.

The J. I. Case Company, of which Mr. Morrow is an executive, conducts a 30-day indoctrination "course" for their company pilots. This period is spent teaching the new flight personnel the little items of consideration for the passengers that spell the difference between their employers really enjoying the flight or just enduring it.

Pointing out that most corporation executives are *not* veteran flyers, Mr. Morrow explains that some of the routine procedures of piloting can be frightening or at least alarming to the uninitiated passengers.

The design of the average executive transport is such that the passengers can watch the pilots up forward with the result that they notice any unexpected and unexplained move upon the part of the crew.

The sudden snatching of a map to verify a good check point spotted below can produce a "Good heavens, we're lost" feeling in the passenger while a routine switching of tanks or changing of engine or propeller setting can cause apprehension in the passengers unless they know *why* such changes are being made.

The Case company makes it a point to invite one of the executive passengers to sit alongside the pilot during a flight to see just what happens and why certain adjustments of the powerplant or instruments are made.

Even though a trip may not be quite routine, it is important that the flight crew treat it as routine, at least as far as the passengers are concerned. One company sold its aircraft and released its entire flight crew, then bought another aircraft and hired another new crew to fly it, for the very reason that "every flight was an adventure" with the old personnel. Each trip was fraught with one crisis after another, regardless of how good the weather was or how perfectly the aircraft performed. Executives want routine flights, not adventures from their executive pilots.

Plane-O-Tel Protects Cars Too

New $50,000 building at Love Field, Dallas, Texas, holds either 10 twin-engined executive planes or 20 single-engine craft. Rear of hangar has covered sheds for cars belonging to executives away on business flights. Forty cars can be accommodated in the shelters at a small monthly fee per owner. Plane-O-Tel building is 400 feet wide and 40 feet deep.

Statistics Wanted by Headquarters

Your Association headquarters has had many requests for various types of statistics in connection with executive aircraft operation.

Naturally we have tried to supply answers to these many requests but we find that it is difficult to locate data on many phases of executive operation.

Realizing that details of aircraft operational expenses are often considered confidential by the owners, we nevertheless would appreciate such data on an anonymous basis. If members would send in such information, it would be treated as confidential as far as source is concerned and would be disseminated only as a typical case, not as the experience of a specific company.

Not only is data on operational expenses requested but information on operational short-cuts, hours flown per month, insurance, how flight records are kept and operational expenses are allotted to various departments. All such types of executive aircraft data will be made available to members for their guidance to better economy in both maintenance and operation.

Send this information to National Headquarters, attention Executive Secretary.

Be Careful of the Drug Dramamine

A warning from the Civil Aeronautics Administration has been received regarding the new drug for the prevention of air sickness—Dramamine.

This drug has been developed for use by those subject to motion sickness, particularly while flying, and has proved to be very successful in many instances. However, in some cases undesirable effects have resulted.

In a group of volunteer CAA employees tested over a six-day period, over 66 per cent of the cases where dramamine was taken (some received harmless sugar pills instead) reported reactions.

Drowsiness, slight dizziness, chills and a "detached" sensation resulted in some individuals while even loss of balance and difficulty in focusing the eyes have been reported in a few extreme cases. While none of these symptoms have developed to a degree dangerous to a "passenger," such "side reactions" might be very undesirable and hazardous to a pilot in charge of an aircraft.

Modern Welding Company Finds "195" Handy

More and more operators of executive aircraft are finding the addition of a smaller plane an advantage.

CAOA member, Modern Welding Company, of Owensboro, Kentucky, fabricator of structural steel and steel storage tanks, has plants or offices in Ohio and Florida as well as in Kentucky. They also operate in and out of small fields in conjunction with their pipeline division. Their Beech 18 is used for the longer hops but they have found that the Cessna "195", recently added to their aviation division, is especially efficient on short flights to nearby plants and in getting in and out of small fields close to their many active projects.

Chief Pilot, Orville R. Armstrong, invites enquiries on smaller ship use.

Public Sees "Executive" Grow in Pictures

Deciding that the general public as well as their customers might like to see how an executive aircraft is constructed, Dallas Aero Service, began taking pictures from the start on a Douglas C-47 executive conversion. These were posted in the window of the customers lounge in the administration building and kept up to date with new pictures as the conversion progressed.

New Lights for New York International

New lighting installations for Instrument Runway "V" of New York International Airport are to include the slope-line system requested for the port by the Civil Aeronautics Administration.

Construction of the piers for the lights is more than half-way completed and it is expected that the entire slope-line system will be ready for operation by the middle of fall. It is scheduled for service in November barring unforseen holdups.

Butler Good Host in Chicago

Several of our members have reported very favorably on the Butler Company (Aviation Division) services at the Chicago Municipal. They specialize in servicing executive aircraft and many CAOA ships have been their customers. According to Don Reagan, their General Manager, over 300 executive aircraft have visited their facilities.

Butler operates on a 24-hour schedule seven days a week with no overtime charges for Saturday afternoon or night, Sunday or Sunday night. They have a pilot's lounge as well as an executive's lounge, a conference room that will accommodate up to 12 executives, secretarial service, two courtesy cars and facilities for showers and clothing changes if desired after a trip.

In addition to these important conveniences, Butler will handle personal calls, hotel reservations, airline reservations and many other little courtesies.

The Butler Company works very closely with the pilots of executive aircraft realizing that any economy that can be effected while keeping to the highest quality of workmanship will promote better pilot-owner relations as well as furthering the use of executive aircraft in business.

Mr. Reagan extends a cordial invitation to CAOA ships when in the Chicago area.

Committee Chairman Didn't Bounce

Members of CAOA's Technical Committee are invited to test various types of new equipment when ready for the public.

Recently, Walter Pague, Chief Pilot for Armco Steel Corp., and Tech Committee Chairman, had an opportunity to test the new "no-bounce" landing gear developed by Aeronca Aircraft Corp. of Middletown, Ohio.

Walt reports that the gear certainly lives up to its name. Landings were made after drops of several feet with no rebound into the air after contact. Even one wheel drops were accomplished with safety and no bouncing whatever, even from the one wheel impact.

Although at present designed for light aircraft, it is expected that later versions will be developed for the larger executive types.

Does Any Member Have the Answer?

National Headquarters has had a request from a potential member regarding what should be considered "adequate insurance coverage for an executive aircraft".

He points out that even a small executive plane might involve the owner in a suit running to millions as in the case of the collision between a small plane and a huge transport over Long Island a few months ago. This prospect is anxious to ascertain just what *is* considered adequate liability coverage for an executive transport and how one goes about obtaining policies to such an extent.

Any such information will be considered confidential as to source and passed along to the prospect in question as well as to any other interested in the vital matter of executive aircraft insurance.

C.A.P. News from Hq.

Unauthorized Insignia
Nat'l Hq., Washington, D. C.: Attention all Civil Air Patrol Commanders. Wing Commanders are requested to enforce the wearing of authorized Civil Air Patrol insignia only by CAP members. Too many CAP officers and cadets are wearing unauthorized insignia and also insignia for which they are not eligible or qualified to wear. Reference is made to CAP Regulation 35-4 for authorized insignia. Particular attention is invited to a piece of unauthorized insignia manufactured without authority from this HQ by Federal Supply Company, New York City. It is a silver wing and propeller ornament supposed to replace the porcelain or cloth replica thereof worn on the overseas cap. This insignia ornament was not ordered and will not . . . repeat . . . will not be worn by members of Civil Air Patrol.

Link Trainer Available
Hastings, Nebraska: Hastings Flight recently notified Omaha Headquarters that they have a Link trainer available for another unit. Price: $125.00. For further details, write Capt. Harold Dwyer, Hastings CAP, Hastings, Nebraska.

Breakfast Flighters
Denver, Colorado: One of the most active squadrons of the Colorado Wing is the Colorado Wing Civil Air Patrol Women's Squadron # 3 of Denver. This summer the girls have logged a great deal of time in the air via Breakfast Flights. These flights have become increasingly popular, and many more are scheduled as part of CAP Squadron # 3's social activities.

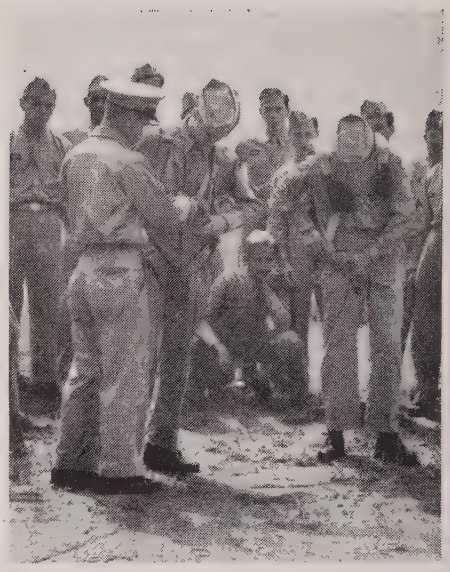
Search Mission
Omaha, Nebraska: Fifteen Omaha cadets recently participated in a practice search mission. Using walkie-talkie radios and a portable AN/TRC-2 transmitter, the cadets searched for a "crashed" plane in an area south of Omaha. Cadet Lieutenant Harold Storm, Jr., and Sgt. Paul Lundberg spotted the "downed" L-4 and reported their finding back to base operations.

Cadet Captain Edwin Burrell and Lieutenant Allen Demorest were in charge of the practice search mission.

Operation Retrieve
New York: Senior members of the Southern District of the New York Wing, including Westchester County, Manhattan and Long Island, are participating in a cooperative training mission with the Navy. Called "Operation Retrieve," this training mission will see the Navy sending out several submarines on training cruises off the coast, while the Civil Air Patrol will set up a regular wartime coastal patrol base and send out patrol squadrons off the coast to search and plot the positions of submarines spotted. Purpose of the mission is to refresh the members as to the duties of Civil Air Patrol in coastal patrol during war emergencies.

Drill Team Wins
Passaic, N. J.: Competing against drill teams from CAP units in New York, Massachusetts, Georgia, Connecticut, Alabama and South Carolina, the drill team of the New Jersey Civil Air Patrol this spring won the honors in the regional drill competition to select the drill team from the U. S. which will march against a picked team of the Canadian Air Cadet League in Toronto.

Drill Master of the winning team was Cadet M/Sgt. C. Chadney of Milford, N. J.

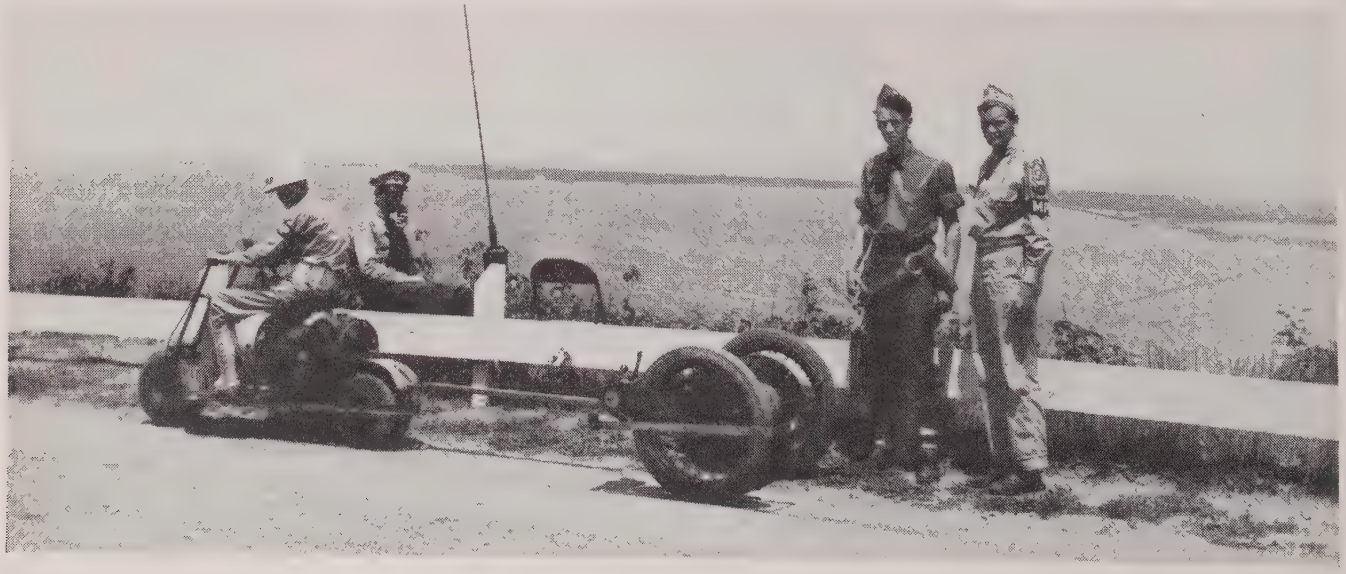


CADETS based at Mitchel AFB, N. Y., get class instruction in use of parachutes

Summer Encampments
Washington, D. C.: First-year Civil Air Patrol cadets are now rounding out their summer encampments at 22 USAF bases in the United States, Alaska and Hawaii. Accompanying the cadets to the various bases are some 200 senior CAP members, reinforced by a contingent of volunteer Air Reserve Officers, to see that the cadets are well taken care of.

Each cadet must attend two encampments before he can qualify for his certificate of graduation from the three-year CAP pre-flight training course.

WIRE PICK-UP was built recently by members of the Asbury Park Civil Air Patrol Squadron. Materials used were from old motorcycle



Pilot Report . . . New Navion

(Continued from page 22)

that eliminates the "clothes-line" between fin and wing-tip. A new short whip antenna is used by the new RCA VHF transmitter and a short fuselage-to-fin single antenna is ample for the radio receiver.

The engine is identical with those in the military *Navion*, the L-17B, and is rated at 205 hp. Equipped with a silver alloy thrust bearing and steel cam shaft, the engine is designed to turn 2600 rpm on take-off. Full throttle is recommended for climbs since a fuel enrichment valve operates at full power and helps keep head temperatures cooler.

Covers have been added on both nose and main landing gear to clean up the air-flow in flight. The original experimental work on these gear doors was done by Long Beach Airmotive on King Williams' *Navion*. A gas-cap cover has been added to cut down drag and eliminates a high whistle formerly common on *Navions* in flight.

At this point, Doc Sloan showed us his loud, knitted sox, used primarily in demonstrating the rugged metal skin of the *Navion*. Sloan took his shoes off, then walked all over the airplane; wings, canopy, tail surfaces and all! We admired the plane more than the sox.

It is inside the cockpit, however, where Ryan engineers have really gone-to-town. All of the refinements on this new airplane were originally suggested by *Navion* owners in a survey conducted by Ryan.

There is nothing on the 1949 model's instrument panel that does not have something directly to do with flying the airplane. All the indicator lights for the gear and the hydraulic system have been moved over to the far left corner of the panel. A dimmer switch on these lights for night flying automatically cuts part of the brilliance when the navigation lights go on, and a rheostadt adjusts them from there.

The ash trays have been moved from the top of the instrument panel to a position down low on the sides of the ship. Formerly these ash trays were immediately adjoining the windshield vents.

"I took Mr. Ryan on a trip to Fort Worth last year," explained Doc Sloan, "and he was pretty well covered with ashes before we landed. Mr. Ryan asked me why I hadn't told him sooner about these ash trays. Now with the ash trays in this new position you can deposit your ashes without spraying them clear through the whole airplane.

"Before you start the engine," said Sloan, "begin at one side of the instrument panel—either side is OK—and then check every knob, button and control on the panel. In that way you won't forget anything."

The mixture control and the carburetor heat have been moved eight inches apart, and there is a lock on the mixture control. The flap lever is shaped like a flap and the gear lever is formed like a wheel.

The cigarette lighter and dome-night switch have been taken off the well-filled instrument panel and a manifold pressure gauge has been added as much needed standard equipment. These are all steps in the direction of making a safer airplane for the average pilot.

At last, too, there is a key ignition on the *Navion* as well as a cabin lock—and each airplane has a different lock. In the past, a *Navion* cabin key would open any *Navion* on the field. However, it does take two keys for the new *Navion* since the cabin key does not fit in the ignition lock.

As we started the engine, Doc Sloan explained the dual fuel-pump system on the new model. Two independent fuel pumps force gas from the wing tanks to the engine. One is an engine-driven vane pump while the other is electric. The 20-gallon auxiliary tank, installed as extra equipment, has been moved forward under the rear seat to provide more baggage space as well as to keep the center of gravity well forward.

The foot starter is mounted on the firewall above the pilot's left rudder pedal. There are no brakes on the rudders since the center-mounted hand-brake system originated by North American has been maintained by Ryan. However, larger brakes have been added.

As the 205-hp Continental warmed up, we taxied out to the extreme end of the 8800-foot runway. We wanted to check the rate of climb from the 14-feet-above-sea level Lindbergh Field. There were three of us in the airplane and full tanks. The wind was blowing 10 mph and hit the *Navion* quartering from the tail.

NAVION, 1949 model, is shown here parked at Rancho del Cielo. Note furrow in strip

In a full-throttle climb, we had over 1100 feet over the boundary of the airport in a minute and a half. Air speed was held as close to 70 mph as possible.

There's no getting around it, that extra 20 hp really helps the ship get into the air.

The next impression a pilot receives on his first hop in the *Navion-A* should be, "My, how quiet it is up here!" We were able to converse in completely normal tones and the commercial radio programs came in easily—there was none of the usual garbling that comes from excessive speaker volume. The noise level has been cut by almost doubling the thickness of fiberglass in the fire wall, using thicker insulation on the cabin and canopy and a heavier gauge windshield. Actually, most of the cabin noise in the *Navion* comes from the defroster ventilators located at the base of the windshields.

We headed east toward "Rancho del Cielo," (Ranch of the Sky). Actually, the strip is within sight of Lindbergh Field. It is dirt, somewhat rough, has a road with a ditch at the short end and a precipice at the other end should you overshoot. It is actually 1700 feet long, but there is a 20-foot hump about 100 feet down the runway from the approach end. And if that wasn't enough, there is a slight bend in the runway just over the top of the hump. Believe me, it's no field for practice landings!

We pulled up, slowed to 100 mph and dropped the gear.

"Look, Doc, if this approach doesn't look right to you, don't be a bit bashful about taking over," we said as the *Navion* turned on the base leg. "After all, it's your airplane and you're familiar with it from flying it all the time."

"Don't worry, I love this baby," said Doc as he patted the instrument panel affectionately.

Turning on a long final approach, we were a little high so we snapped down full flaps; that's 43°. The *Navion* arched her back, slowed up quickly and started downstairs in a hurry. We had to add a little power to clear the furrow of loose dirt on the shoulder of the road across the short end of the runway.

The air speed was dropping below 65 as we came across the road. From the cockpit you could see nothing but the crest of the knoll as we snapped closed on the throttle and came back on the control column at the same time.

The ship flared out quickly and squatted on the uphill end of the knoll as the rugged shock absorbers flattened out the bumpy strip.

We came up over the top of the knoll and more or less skidded down the other side, using a little rudder and brake to negotiate the slight turn in the runway. It was every bit the same sensation there is to sliding down an icy hill on a toboggan sled. We weren't flying and we weren't taxiing—the shock absorbers were just hitting the high spots.

Once we hit the bottom of the hill, our speed dissipated immediately and we had to open the throttle to taxi up to the west end of the runway. It was all very interesting, but no wonder so few planes land at this private strip at "Rancho del Cielo!"

We cut the switches and climbed out. Betty Gillies walked out of the ranch house to see who had landed. She told us the "airport" had been built in 1945 and no improvements had been made since that time. She and her husband had used it for their BT, which they later sold, and were now using it for their own *Navion*. With an all-metal painted airplane, Mrs. Gillies reported she and her husband didn't feel the need of a hangar.

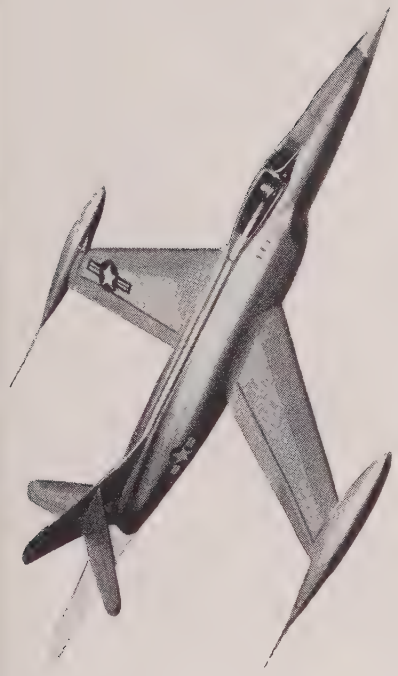
Doc Sloan glowed with pride at that.

Actually, we didn't fully appreciate the size of the hump in this airport until we had to use over half-throttle to taxi up over it before take-off.

As we poured on the throttle for take-off, we pulled well back on the control column to keep the propeller up out of the loose gravel that covered the runway.

(Continued on page 55)

Lockheed Penetration Fighter...



range, speed and durability

This is the F-90, a Jet Penetration Fighter, built for the U. S. Air Force by the Lockheed Aircraft Corp. It is designed to fly long ranges at high speeds. It can *penetrate* deep behind enemy lines to win and maintain air superiority and to destroy ground installations.

The F-90 is a big airplane for a big job. It is a rugged fighter, capable of inflicting heavy damage and taking a lot of punishment. And it is a two-fisted fighter—two jet engines, duplicate controls and two sets of everything else vital to an airplane's operation. It could suffer direct hits knocking out either engine or set of controls and still return to its base.

The F-90 is a versatile airplane, able to perform many jobs besides penetration fighting. It can be adapted as an ideal photo reconnaissance plane. Camera equipment can be serviced or replaced in a matter of minutes. Another simple modification and the F-90 is an excellent intercepter with outstanding climb, maneuverability and fire power. This quality of being many models in one spells additional Air Force economy and efficiency.

Lockheed

LOOK TO LOCKHEED FOR LEADERSHIP

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Helmet Trouble

(Continued from page 17)

"Able five-zero to Able three-three: I am at 7,000 feet over Sweetwater circling left. What is your location? Over."

"Three-three to five-zero: we're right behind you. Throttle back a little and join up. We're supposed to go to Pyote and back tonight so snap it up. Over."

"Wilco, three-three. Out."

I throttled back after spotting the flight, and slid into position on the wing of the lead ship. Suddenly the three planes began to pull away from me. I added more power. Still I fell behind.

By that time they were about 100 yards ahead, so I pushed the throttle to the firewall. I was still unable to catch up.

"Able five-zero to Able three-three: I can't seem to hold position. Circle left and I'll rejoin. Over."

The flight leader's patience was wearing a trifle thin; his nerves, at best none too calm, were reputed to jangle audibly at times. He had flown in three theatres of war, and had looked into the faces of both German and Japanese pilots.

"What's the matter, five-zero, have you got throttle-arm paralysis? Come on, give that can of bolts the needle and let's get going."

He circled the flight to the left, and I cut over to intercept him. I didn't even get close. As I stared at the three-tails moving rapidly away from me, I tried to figure out what could be wrong. A careful check of instruments revealed that everything was as it should be, except that I was making only 180 mph instead of the normal cruising speed of 230. And with full power, I should have been hitting over 300!

"Three-three, would you please cut sharply left once more—I can't seem to get any speed out of my ship. Over."

The bellow which followed was in violent contrast to my own apologetic voice, and I was forced to turn down the volume of my radio. The leader whipped his plane into such a sharp bank that he nearly lost the other two members of the flight.

I made one last desperate stab at the three dim shapes that loomed up out of the murky blackness of nearly nightfall. For one short instant my plane was in place—then, as before, it fell behind as if I had cut the throttle.

"Three-three, I'm pulling 45 inches of mercury with 2,400 rpm's, and I still can't get over 180 out this ship. My instruments check okay. Over."

His voice sounded resigned, as if it were his eternal lot to deal with morons. "Okay, McCulloh, go back and land. Better tell the tower it's an emergency. Out."

I peeled off, located the field and put the ship in a dive to get rid of some altitude. I was a little uneasy at the prospect of making a night landing in a plane that had an unknown ailment. Switching to standard frequency, I called the tower.

"Avenger tower, this is Able five-zero for landing instructions. Emergency landing, please. Over."

"Roger, five-zero. What's your trouble? Over."

"Seems to be inadequate power, Over."

"Take runway three-six, and be careful, five-zero. Over."

"Wilco. Out."

While lining up with the runway for my approach to the field, I again cursed my bad luck. When it rains, it pours, I thought. Everything happens to me tonight. Anyway, none of it is my fault.

The critical point was at hand. Making sure that everything I did was exactly right, I came in at 500 feet to make my peel-up to land. The cockpit was as black as the night itself. I extended my left hand to rest it on the landing gear handle, so that I wouldn't have to grope for it after peeling up to let down the wheels and flaps.

The landing gear handle wasn't there!

In one blinding, infuriating fraction of a second, electrifying and humiliating realization broke over me. The landing gear handle was in the *down* position—I had been flying around for 45 minutes *with my wheels down!*

I didn't peel up to land. I merely flew by the tower at an altitude of 500 feet. I shook my head, pulled up the wheels and called the tower.

"Tower, this is five-zero. I've found the cause of my difficulty and am going back up to rejoin my flight. Over."

The voice in the tower was dubious. "Well, okay, five-zero, if you're sure everything's under control. Over."

"Roger, tower. Everything's okay. Out."

The reason, of course, that I hadn't been able to get any speed out of the plane was that the landing gear put up a terrific air resistance. I had been so occupied in grumbling to myself about my troubles that I had completely forgotten to raise the wheels after the take-off.

It was very warm in the cockpit, and I felt low enough to stand flatfooted and kiss a grasshopper's ankle.

I switched back to the other radio channel, called my flight leader, and told him that I had found my trouble and would climb up and rejoin the flight.

Speaking slowly and distinctly, with remarkable self-control, he said "Your trouble isn't under the cowl, Lieutenant." He paused for effect, then screamed, "It's under your helmet."

I didn't rejoin my flight that night. At the time of my leader's little speech, he was at 10,000 feet over Big Spring, 60 miles west of Sweetwater. Consequently, I had to circle the field by myself for an hour and a half, while waiting for him to get back. When he did return, he slipped the flight in without saying a word until he called the tower for landing instructions, and was thus able to land about 10 minutes ahead of me.

When I had parked my plane and walked into the ready room, he was waiting for me, parachute still on, helmet cocked over one ear, cigar in his mouth, hands on hips—and a look on his face.

I opened my mouth to speak, but he raised his hand, and the words died before their birth. Then, slowly shaking his head, he stalked majestically out of the room.

Nothing he could have said would have been as eloquent as that stormy silence.

Boy! Was I beat!

Plane Efficiency

(Continued from page 25)

had been experimenting on this particular plane. It was trying to find out how a paint job would affect the fighter's speed. Sections of the plane had undergone wind-tunnel tests to determine air-flow characteristics over the surfaces under different paints. Researchers had finally sprayed it with a plastic coat about one-thirty-second of an inch thick, and had estimated that at speeds around 500 mph, the smoother surface would add another 4 per cent in miles-per-hour.

Later, when I had the plane, we proceeded to finish off the rest of the surface with the same plastic compounds. It required 14 coats, the last seven of which were hand-rubbed. For racing purposes, it was worth it.

Then there was the A-26. Or I should say, there were two A-26's.

First was the "Reynolds Bombshell" that flew around the world. I could pretty well figure, after I got to know the airplane, that there would be a 5- to 6-mph difference in speed (at around 300 mph) depending on whether the plane was dirty or clean.

Later on, Douglas Aircraft ran a series of wind-tunnel tests on another A-26. Douglas experts noted a 2- to 3-mph increase in speed when the plane was polished. Then they tried an interesting stunt, successively taping over all the cracks in the skin with cellulose tape. Gradually, as they sealed off more and more of the metal joints, the speed continued to build up another 10 or 11 mph.

The explanation? Air entering through cracks in the metal, formed bubbles when it was forced out again at some other crack. The tape had the effect of sealing off such air passage, and preserved a free flow of air over the plane's exterior skin.

A-26's aren't *Cubs*, it's true. But the lessons learned from the A-26 and the P-47 made me make mighty sure the "Waikiki Beech" was well polished and rubbed down before the flight. This was done at the factory in Wichita, and also later in Honolulu. The day I left for Teterboro, while I was catching a few last winks, a crew of four local airport workers spent almost a full day polishing the plane and rubbing it down.

I figure this meant about a 2- to 3-mph gain on the *Bonanza*. Not much, it's true, but on a 36-hour flight, an important consideration. And again, it wasn't so much this one thing that helped as it was a combination of many little things that accumulated to make for optimum efficiency.

I understand that *Bonanzas* that have been painted and polished, get a couple of extra miles per hour, too.

Every pilot knows what drag can do to a plane. On the "Waikiki Beech" we made every effort to be sure this drag was cut to a minimum. Being one of the early models, this *Bonanza* did not have the external step for passengers climbing up on the wing. This step alone means a decrease in about 3 mph on planes equipped with it.

The "Waikiki Beech" carried a load of radio gear, but every effort was made to keep antennas and other necessarily outside gear down to a bare minimum. The Lear ADF loop, for instance, instead of being housed in the conventional external tear-drop shaped housing, was placed in the plastic tail cone which formed part of the necessary fairing of the tail section.

The "V" tail design of the *Bonanza* is a big step in the direction of decreased drag. The same plane redesigned as a trainer under Army specifications loses approximately 5 mph because of required change over to the conventional three-piece tail section of elevator and rudder.

With the idea of the Honolulu-Teterboro trip before us, we tried to figure all the angles that would increase efficiency. We had to, of course, or the trip never could have been made. One of the other devices consisted of cooling the gas from the normal 85 degrees March temperature in Hawaii to 10 degrees below freezing, Fahrenheit. Doing this increased the density, so that, although the gallonage of 288 stayed the same, the poundage of the gas increased—and an engine eats pounds of gas, not gallons. It meant an equivalent by weight of 12 additional gallons.

Of all the techniques mentioned here, probably the only one of practical importance to a lightplane owner is the desirability of getting a hand-rubbed surface on your plane (if it's a fabric job and if you can afford it). Old hands around any field will tell you a polished surface not only looks better and lasts longer, but will give you some kind of slight edge in speed. If you've got an all-metal job, polishing will always help, and you can talk around the idea of a paint job. The slower the plane, the less these factors mean, of course. But in any case, cleanliness pays off.

But the real pay-off for me, certainly as far as the "Waikiki Beech" flight was concerned, was the effectiveness of the power curves and the charts worked up prior to the flight.

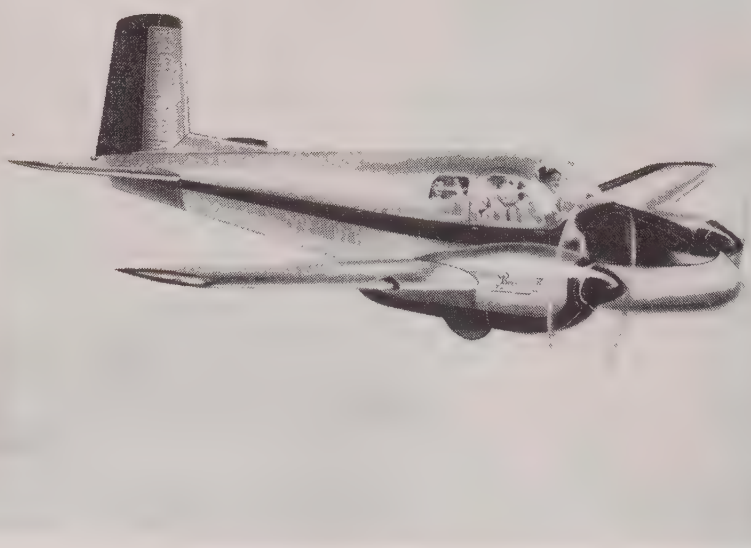
It all started in the Continental Engine factory as Muskegon. Here they took the stock engine that had been assembled for installation on the "Waikiki Beech" and began a series of special tests on the factory bench. With the engine run on a dynamometer to measure horsepower, flowmeter tests were made to work up data on most efficient engine RPM's under various load conditions.

When this was finished, we stuck the engine in the back seat of a *Bonanza* and flew it down to Wichita. Here it was installed in the "Waikiki Beech", and Jerry Gordon, aerodynamic engineer for Beech, using the Continental data as a starter, began outlining a series of flight tests to simulate all the possible conditions I'd be likely to run into.

To get accurate data, a sensitive glass-tube type flowmeter was rigged up in the plane, and an extra cylinder head temperature gauge was installed.

The tests started out with a check for most efficient RPM settings. We picked three settings to try out, 1750, 1850 and 1950. At 1750, for instance, I would cruise in smooth, calm air for 10 minutes each at air speed of 100, 110, 120, 130, 140 and 150 Indicated at 2800 lbs gross weight.

(Continued on page 48)



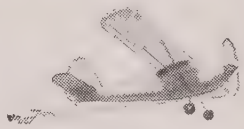
New Twin Bonanza

Something new is being added to the Beech line. Designated Model 50 Beechcraft, this new ship is designed primarily as a five-place plane, but on short hauls it can accommodate six. Its estimated price is about $30,000.

PLANE FAX

first in U.S.!

POWERFUL NEW GASOLINE ENDS TAKE-OFF KNOCKING



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New gas meets need for take-off anti-knock rating

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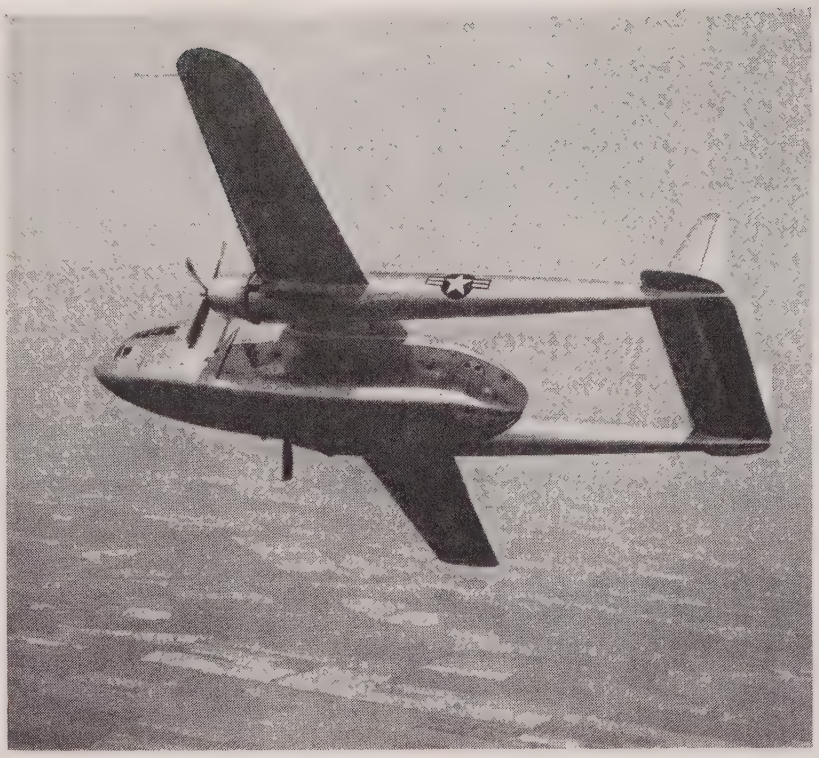

FIRST PRODUCTION MODEL of the Fairchild C-119, cargo airplane developed for the Troop Carrier arm of the Tactical Air Command, recently took to the air for its initial flight tests. Though looking like the C-82, the C-119 is an entirely new ship

Plane Efficiency

(Continued from page 46)

When steadied down at each speed, I noted the manifold pressures needed, marked down the altitude, and the fuel-flow readings from the flowmeter. Then at each speed, I'd lean out the mixture from full rich to lean, until the temperatures rose and started to drop again (indicating a loss of power), all the while recording fuel flow at the different mixtures.

Then at the same altitude, the same tests would be made at 1850 and 1950 RPM's.

This was just the beginning.

This same series of tests was made for the three different altitudes of 4,000, 8,000, and 12,000 feet.

Then, after these tests, we ran the whole series all over again, this time at 2400 and 3600 pounds gross weight. For each new weight the whole series of tests was repeated at the three RPM's and then the three altitudes.

It was a tedious job, but out of it, I got so I could judge pretty well what the fuel flow was going to be by the cylinder-head temperatures developed at various mixture settings. This turned out to be half the trick of the successful trip over from Honolulu.

During all of this, the team that really put the flight across was working beautifully under Jerry Gordon's guidance. Vern Carstens, chief pilot for Beech Aircraft spelled me for a good number of the test flights that were made.

From the results of the tests, Jerry drew up the final cruising charts. They were worked down to such a fine degree that eventually the readings appearing on the charts became the actual settings I read off the dials of the "Waikiki Beech" in flight.

Naturally, with the book settings in front of me during the trip, my paper work was cut to a bone, and with plenty to keep me busy anyway, the data book was indeed a happy solution.

Out of the tests came some interesting data. During full throttle tests on the stand at Continental, for instance, it was observed that when the fuel consumption was cut from 94 lbs per hour to 84 lbs per hour by leaning out, the brake horsepower only dropped from 186 to 184.5. The lean mixture, it is true, caused a cylinder-head temperature dangerously close to maximum allowable. But in actual flight, while climbing and throughout the flight, I was able to save considerable fuel knowing the situation, and a constant check on the cylinderhead temperature gauges kept me within a safe margin.

Then at Wichita we found that at 1750 RPM's, an increase in Manifold Pressure over the commonly used setting of about 17.7 inches of mercury, gave us both increased engine efficiency and also prop efficiency.

And also, for the same horsepower loaded on the engine, we actually got a couple of miles an hour faster air speed at 1750 RPM's than at 1950 RPM's.

In general, lower rpm's and higher manifold pressures produce greater efficiencies. The indicated speed for maximum range on most airplanes is approximately 10 per cent higher than the indicated speed for maximum rate of climb.

At another point, it was shown that at a certain altitude and with a certain load, a drop from 140 to 108 miles IAS resulted in an increase of 2 miles per gallon, or 10 per cent. In other words, the additional 32 miles per hour at 140 were obtained at a cost of about 537 miles total range.

After seeing things like this develop, I was soon sold completely on the idea of the book of charts and the correlative graphs by which I could choose optimum settings with the greatest of ease. There seemed to be no formula that could be worked out to establish this kind of efficiency. It was simply the proven figures that did it.

An example of how I used the material can be seen by reference to the chart which is included in this article on page 24. I started using this particular page 25 hours after take off from Honolulu. Before leaving I had marked out in the book, the altitude I intended to fly during the various stages of the flight, and had picked the best cruising set-up for that altitude. I marked this by a pencil line like the one in this illustration. (Note the 12,000-foot bracket.)

The critical column, of course, is the "miles/gallon" column. On this page, it's true, I could have gotten better efficiency down at 4,000 feet where you'll find the figure 20.08, whereas at the chosen altitude, I got 19.70 miles per gallon. But as the pencilled note at the bottom indicates, I had been forced to climb to 11,000 during this period to get over the west coast mountains.

Note also that the slight loss in efficiency of 0.38 miles per gallon between the 19.70 and 20.08 settings meant, at the same time, an increase in True Air Speed from 116.8 to 132.1 miles per hour. Getting to Teterboro in a hurry was, of course, important to me even at some cost in fuel efficiency because I had to fight sleep toward the end.

At other points during the trip I also passed up the best settings indicated in the miles/gallon column on other pages when the winds aloft more than made up for the slight loss in engine efficiency in terms of fuel consumption per mile.

The page shown here is based on a forecasted weight of 2800 lbs after 25 hours out, and fixes 1750 as the best RPM setting. To get the performance required, I simply had to read a throttle setting of 16.8 inches of manifold pressure in the proper column.

The "67 gals" notation at the lower right of the chart is simply a reminder I scribbled to myself that, at the rate of 6.70 gallons per hour consumed, as indicated in the gallons per hour column, I'd be minus that much fuel after having stayed on this page for a full 10 hours.

The charts are that simple to use, and I'm convinced that if they were made up for all lightplanes, they would be of tremendous value to all private pilots.

For each chart supplied in the data book, there is a corresponding graph

(Continued on page 52)

National Air Races -- '49

(Continued from page 16)

Kansas, Peoria, Illinois, and Fort Wayne, Indiana. Identifying code letter-numbers will be issued all contestants the night before the race so that other pilots will not be able to identify each other as they check in at the control points. In this way, the progress of the race can be broadcast to the spectators in Cleveland, so that they will have a complete running picture of how the race is progressing.

The Goodyear race may be altered this year to include three pylon turns at each end of the course. This system was used very successfully in two West Coast midget races earlier this year. The wider turns remove the main difficulty previously encountered by midget race pilots who "racked" their planes into the turns too steeply and developed high-speed stalls. Put this accelerated stall in the turbulent air formed by the slipstream of a leading airplane and even a good pilot can get himself into trouble. These three pylon turns cut the degree of turn from 90° to 60° and tend to reduce the "g" loading from six to not much more than three. This more oval course in no way detracts from the spectator thrills but it does make the sport of midget-plane racing a great deal safer for the flyers.

Specifications for the midget-plane class have been set up deliberately so that almost anyone with about $2,000 and an urge to build a Goodyear racer can get into the air race business. The engines are strictly stock and spring steel landing gears can be purchased complete from Cessna. Weight and wing loading have been kept on the conservative side so that these little planes will be both rugged and fairly easy to fly. They're pretty evenly matched and they can give the crowd a whale of a show for their money.

The main trouble with the big airplanes we have this year, as many a pilot has found out, is that they involve too much money to be maintained properly. A pilot can race so seldom that a souped-up F-51 parked in the backyard is almost like a "white elephant" that eats you out of house and home. The only chance a war-surplus plane owner has to win back part of his investment today is in the Thompson and Bendix races plus the Sohio and Tinnerman events which are actually qualifying heats for the Thompson Trophy race.

The rest of the time, the airplane is collecting dust, cobwebs and tie-down fees because the average bankroll—particularly a pilot's—won't buy fuel and adequate maintenance for these big planes.

And from the standpoint of the fans who actually pay for these races, there is nothing particularly exciting about these 15-mile courses such as the Thompson since there is so much of the course that the paying customer can't see. We've found that out the hard way and that's the main reason for the now-popular Goodyear midgets.

Actually, it isn't the top speed that makes spectators stand up and cheer. It's closely matched competition. I could buzz the field with an F-80 at three times the speed these midget planes develop, but there would be nothing in it for the crowd but a stiff neck from swinging their heads so fast.

One thing that air racing has lacked in the past has been good showmanship. It's important to please the public, and they like nothing better than close competition. The four-and-a-fraction seconds separating "Fish" Salmon, Steve Wittman and the late Art Chester in last year's Goodyear finish is what the crowds go home talking about—and return the following year to pay to see again.

If close competition does not develop naturally, I believe that a handicap system should be set up. By starting a slower ship ahead of the faster competitors you'd have a much more exciting race. Say that one ship qualifies over a two-mile course in 40 seconds and another is clocked in 41 seconds. In a 12-lap race, start the slower ship six seconds ahead of the faster one; just half the theoretical lead of the faster plane at the end of the race. After all, horse-race handicapping has certainly paid-off from the fan's standpoint.

Here's an idea—and so far it's only an idea—that some of us have been toying with that might interest the "big money" in small-plane racing: The turbo-supercharger from surplus

(Continued on page 63)

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Pogo Stick Airline

(Continued from page 29)

daily by these modern mailmen. The routes are circular in pattern and use the Los Angeles Municipal Airport as a terminal. Flight "A" makes nine landings in an hour and 15 minutes to cities in Glendale and the San Fernando Valley. Flight "B" takes 2 hours and 28 minutes to travel to the San Bernardino area at the very edge of the 50-mile operating radius authorized from Los Angeles and lands at 13 cities. Flight "C" services San Pedro, Long Beach and other harbor cities, taking an hour and 27 minutes to make 12 stops.

Most frequent schedule, however, is the 18-a-day shuttle from the airport to the downtown post office Terminal Annex. This 11-minute flight displaces a trip of an hour or more through heavy downtown L.A. traffic. A new roof was recently authorized for the post office building, and this will permit a flat-top landing space and hangar facilities for the helicopters. Significantly, all future post office buildings will be designed with flat-top roofs for helicopter landings. Pending changes in the Los Angeles Terminal Annex, 'copter pilots are landing on a small section of roof hemmed in by three elevator towers and two high ornamental domes.

Los Angeles Airways is using Sikorsky S-51 helicopters powered by the time-honored 450-hp Pratt and Whitney engine and, to date, have had no forced landings due to maintenance. The original cargo capacity of this machine was 750 pounds, but due to steadily increasing payloads, modifications were made to bring the load up to over 1100 pounds. The fairly recent addition of air parcel post has added a large cargo potential to the already heavy mail loads. Perishable fresh-cut flowers make up much of this parcel post shipment.

The mail-carrying operations of Los Angeles Airways are very informal but precise. Paper work has been cut to a minimum with a single-sheet load manifest, and flights stay on the ground less than a minute for each average landing. In that 50-odd seconds mail from the main terminal is off-loaded and outgoing mail is hoisted aboard. Considerable inter-city local mail is now flown by the 'copters and many business men have found that they can expect faster receipt of special delivery letters than telegrams sent the same short distance. This new source of business was a complete surprise to both postal authorities and airline officials.

Most flights are routed over industrial districts to keep from annoying residents. More than that, these districts make available a larger number of forced landing spots in the many parking lots and loading ramps in those areas. Flights seldom go higher than a thousand feet and, while Maxim exhaust silencers were purchased, there have been no complaints because of noise. A three-mile detour has been made in the route near Pomona to by-pass two large turkey farms. Chickens and turkeys were being driven into a frenzy by the whirling rotors because, it was believed, of their resemblence to the sound of hawks. The detour eliminated this. One radio check point along the same route is still called "Running Dog" because a nearby ranch house had two large dogs that chased the shadow of the low-flying helicopter on early planning flights.

The 39 landing strips used by this mail service are located on the least expensive plots of land in the area. Typical is the 150 x 200-foot "heliport" that serves Pasadena and South Pasadena. Located near the city garbage dump alongside the Arroyo Seco (dry wash) drainage canal, this "heliport" must be approached between trees and over power lines. The canyon-bottom field is fenced off and covered with crushed gravel to eliminate dust. There isn't enough space even to crash-land a *Cub*, but the 'copters have been operating there for a year without difficulty. There is no conventional airport within a radius of 10 miles.

A number of landings are made at already established airports as at Monrovia and Rosemead, but the flight pattern of the mail planes is far below the 600 to 800 feet normally flown by lightplanes. Landings are made in a corner of the airport, far removed from the flight line, where a truck with a single messenger makes the mail-pouch transfer.

At the Los Angeles Municipal Airport, terminal for all flights, the copters fly below the traffic pattern altitude of the airliners and approach the loading ramp well within the downwind leg of the transports. Landings are made on a taxi ramp or a landing circle directly in front of the mail room at the airport. The helicopter then taxies up to one of the regular airline loading platforms and is met by a motorized baggage truck that carries the mail sacks to the nearby sorting room.

Contrary to "reports" of the Los Angeles Chamber of Commerce, some flights hav had to be cancelled because of weathe The Municipal Airport is within two mile of the Pacific Ocean and the field is fre quently socked-in by low-rolling fog Because of the 'copter's ability to hove however, the CAA has reduced weathe minimums for the mail helicopters to 30 feet and a half mile within the airpor control zone and 500 feet and a half mil away from the field. These are lower min imums than those for scheduled transports

The pilots of Los Angeles Airways tak almost fanatical delight in the precision o their schedules. When asked if he had tim to make a "pass" over the post office build ing for a news photographer, one pilo replied, "I've got 45 seconds before take off and I'm due at the airport in exactl 11 minutes and 15 seconds. Sorry."

No wonder many suburban residents se their alarm clocks by the whirring rotor of the airmail shuttle.

Much of the work of this service ha been purely experimental. Adequate main tenance records have heretofore beer unavailable. Cracked rotor heads wer discovered at 300 hours of operation resulting in changes of construction at th factory. VHF radios, for instance, can b changed as a unit in five minutes. Sinc only five aircraft are employed, a clos check is maintained on all parts for pro gressive wear-and-tear.

Night operation is something new fo helicopters. Together with local CAA offi cials, the airline is establishing a set of re quirements for "heliport" lighting. "Scotch light," a specially treated cloth with re markable powers of reflection, is visible from 1500 feet by the twin landing light of the helicopter alone. Many "heliports" are easily located at night because of thei proximity to neon signs and brightly lighted boulevards. From this study, it may be found that red obstruction lights plus "scotch light" borders are all that will be needed for after-dark operation. Two thousand, seven hundred reflectors have been used for the 40 airports in addition to 1500 obstruction lights.

While helicopter landings are stil classed as a spectator sport and schoo classes have visited the various "heliports" to watch the operation, only a few motor ists will now pull off the road to watch the 'copters land and take off.

This mail service operates on a flat-rate of $1.25 per mile. In the first three months of operation, the 'copters carried 209,000 pounds of mail; 10½ million letters. During the 25 days of scheduled operation in the single month of July, 1948, over 249,947 pounds were carried and 99.6% of all schedules were completed with the aid of good weather. In April, 1949, over 413,000 pounds, representing over 12 million letters, were carried. Over 27,542 revenue miles are flown a month.

President and one of the founders of this company in 1943 is C. M. Belinn. His 16-year association with scheduled airlines has included pioneer work on the Washington-New York Airways, Ludington Airways and the Boston-Maine Airways.

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Using Your ADF

(Continued from page 31)

nember also that you can home automatically direct to station within the frequency range 100-1750 kilocycles. includes most airport towers. This little trick once worked e.

was flying a four-engine transport from New York to on, Ohio. The weather had been only fair all day but expected to remain at instrument minimums or better he duration of the flight. Columbus radio called me when s over the Newark, Ohio, marker at 4,000 feet on instru-s. Columbus reported the Dayton ceiling had gone down 0 feet and the field was closed. Their own ceiling was to 300 feet and lowering rapidly.

was snowing, too. We had come across some mighty weather and no place behind us was suitable for an nate. It was nobody's fault—the weather had just turned -but it was our necks. My co-pilot, Willie Sims, asked check on the weather at Lockbourne Army Air base t 12 miles south of Columbus. It was a new field and no range station but there was a tower and mile-long ays. We were in luck, Lockbourne had 500 feet, light and four-mile visibility. We told Columbus radio that vould descend on the south leg of the Columbus range n and land at Lockbourne Air base. There was a pause, Columbus radio gave us a clearance to proceed. Willie I studied both maps and terrain, but there was no speci-let-down procedure for Lockbourne airport. We made our Our map showed a broadcast station tower located mid-between Columbus and Lockbourne airport. While I d to let down, flying out the south leg of the Columbus , Willie tuned in the broadcast station on the compass ver. When the needle did an about face indicating we passed the station we were at 1,000 feet. I poked the down and Willie called the Lockbourne tower, giving our position.

ou are cleared to the field. Ceiling 500 feet, visibility miles. Light snow. Wind calm," the tower operator ered.

lease hold your mike button down and leave the tower r on until you have us in sight," Willie instructed them. ey did so, and we used the ADF to home directly over ower. We broke out right over the field at exactly 400 and our tower approach was complete. I hope that the her never closes down on you. If it does, I hope that have a beam to let down on, and an approved approach dure to use. But if you don't, I hope that you have an aboard and remember this little story. An airport tower ways located directly on the field. An ADF will always you directly over a station. Therefore, using an old etric theorem—Things equal to the same things are equal ch other—if an ADF will take you over the tower it will take you directly over the airport.

hen shooting bearings, work as quickly as possible and a constant heading. Remember that the ship is moving rd and the third bearing will be taken perhaps one te and two or three miles beyond the first. Because of your final position fix will usually look like a triangle. mercial navigators call this triangle a cocked hat. In to shoot the three fixes as rapidly as possible I like to re a work sheet (see sample work sheet) listing station letters, frequencies, compass heading, relative bearing, tion correction, convergence correction and corrected ng. It doesn't take long to fill in the figures and the time ooting the fix may be noted. Then plot the fix on your chart after all three bearings are taken. If you know e you were 10 minutes ago, and you have been flying a ant heading since, it will not be difficult to determine present position. A study of the ADF chart number , which covers northeastern United States and northern will show us that each range station has a compass rose cing it. This is for ease in drawing radio bearings. A graph at the border of the map describes two errors that be allowed in plotting radio fixes. A Lambert conformal

(Continued on page 53)

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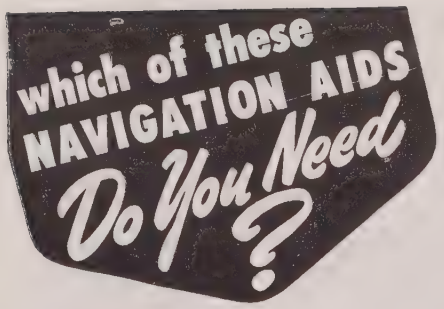

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Plane Efficiency

(Continued from page 48)

which shows pictorially in power curves, the correlation of all the figures.

Back at Wichita after the first crack at the flight when I had to land at Oakland, California, Jerry Gordon reviewed all the information we had accumulated from an aerodynamics point of view, and decided that maybe something ought to be done about the wing-tip tanks. Originally they had been installed parallel to the chord of the wing. We found that the wing was going through the air at a two-degree angle of attack. Therefore, so were the wing tanks which had no aerodynamic reason for doing so. Jerry is a precise man, so he figured on his slip stick for a while, and decided to re-align the tanks so that their relationship with the wing tip was changed three degrees, down to zero angle of attack. The wing tip of the *Bonanza* is flying at three degrees when the fuselage is at two degrees for the long-range speed. While he was at it, he redesigned the tanks for better streamline, and increased their capacity from 58 to 62 gallons each.

Speaking of the wing angle of attack, one of the things that our tests showed is that at settings representing maximum range cruising, you settle down to a wing angle of attack which will remain fairly constant throughout the flight. For maximum range cruising, this represents a fairly low air speed. My cruising TAS of 132 did not vary more than 2 mph during the entire flight and the wing tip angle stayed pretty constant at three degrees with the fuselage angle at two degrees. With the tip tanks attached at a minus three degree angle, this put the centerline of the tank at zero degree for the long-range condition.

It is Indicated Air Speed, however, which is directly correlated with the wing angle of attack and the IAS did change throughout the flight. This showed me that there is no constant characteristic that we could seek as a guide to most efficient cruising. We couldn't settle on a wing angle of attack any more than we could on a propeller or a manifold pressure setting as the one thing that would give us most efficiency. We had to work out a set of actual proven performance figures which took everything into consideration. We had to seek the optimum that could be reached with the *Bonanza* design with one factor played against the other, and the winner showing up in the flowmeter.

Every pilot can't make such tests, obviously. It's up to the aircraft companies.

Of course, after talking power charts all this time, there are probably many simpler methods to increase plane efficiency that I've skipped over.

I know one pilot, for instance, who had a beautiful shiny, hand-rubbed Stinson L-5 converted from Army surplus. The danged thing wouldn't get off the ground, the pilot complained. Finally, he says, he found the key to full take-off efficiency by correcting his feet position on the pedals. He'd been taking off with the brakes on!

Fly Baby

(Continued from page 35)

high-altitude flights as well as an adu but infants under two years are m sensitive to anoxia (lack of oxygen) th adults.

Rough-weather turbulence won't bot an infant as much as it will an adult. child is less likely to become airsick th carsick, due partially to the better ver lation of exhaust gasses in an airplane

Remember that kids are the best p chologists in the world. They'll sense adult's apprehension quicker than otl adults will, so if a pilot is nervous ab his own flying ability, the youngsters his household will know it before makes his first landing.

Flying, after all, is basically an unn ural means of travel for everyone b our feathered friends. However, much the uneasiness can be eliminated by early start in the air. A great many p ents say that their youngsters are m at home in the air than in a car. Th also say that having the little 'un's alo has improved their flying technique i measurably. There are no more Cha delles off the end of the field af take-off and no more wild-eyed slippi approaches for a landing. They fly co servative "long-haired" airline patter and don't mind it a bit.

Many pilots feel that it isn't really smooth landing unless they can touc down and taxi up to the gas pit wit out waking the baby. However, it actually a better practice to wake sleeping youngster before starting a l down and landing so that the child c have a chance to yawn and keep the pressure equalized in his ears. This syste is followed by most airlines.

Here's what to watch out for if it's t first flight for a youngster. First, be su that the child has been well and has h no recent respiratory infection or fev of unknown origin. A young child wi a bad cold may loose a million or tw red blood cells in 48 hours and that cu down greatly on the oxygen-carryin capacity of the blood. This can cause secondary anemia and, at higher al tudes, affect a youngster the same w that heavy smoking, drinking or loss sleep will affect an adult.

If a youngster is well, put him in plane and see what happens. An infa under a year of age will show that h isn't getting along well by being lis less, crying, possible vomiting and, extreme cases, turning blue from lack oxygen. If that blue color is not cause by cold air, get down—but fast! A rap let-down will do little harm except possibly cause an earache or sinus pai and eardrum damage will heal very ra idly in infants.

Some parents have taken a deman type oxygen bottle along on their youn ster's first flights. However, this shou not be necessary since a baby's fir flights ought not to be made at too hig altitudes anyway.

If you must fly an infant very short after birth, check the weather for wind

(Continued on page 54)

Using Your ADF

(Continued from page 51)

ap projection bearing for utmost accu-
cy must allow for convergence of
eridians and for the difference in the
agnetic variation at the plane and at the
ation. The compass rose drawn around
e station is oriented to the local varia-
on. Therefore, simply note the difference
variation at the plane (after a prelimi-
ry fix has been established) and at the
ation.

If the variation at the plane is smaller
esterly or greater easterly than at the
ation, add the difference in variation.
ubtract if the reverse. The meridian con-
rgence correction is 0.6 degrees for each
eridian crossed between plane and sta-
on. Memorize the rule T.W.A. (transport
est add). In other words, if your plane
west of the station, add convergence
rrection.

Using either the automatic compass or
e loop and aural null, it is possible to
mpute your position with respect to any
o or three range stations. Let's assume
at we are lost temporarily on a cross-
untry flight across northern Ohio. We
ant to plot our position by means of
oss bearings and establish a fix. In other
rds, "Where in the hell are we?"

We tune across the range station band
d hear three stations coming in loud
d clear. Identifying the call signs of
ch of these stations we find them to be
eveland, Toledo and Fort Wayne.

We keep our work sheet and watch the
ro compass, trying to hold a steady
ading of 145°. Shooting three relative
arings we find them to be Cleveland
1°, Toledo 221° and Fort Wayne 144°.
e list these on our work sheet noting
act compass heading alongside of each
aring. (It is nearly impossible to hold
perfect heading.)

tions	*Frequency*	*Compass Heading*	*Relative Bearing*
DL	239 Kc.	146°	221°
LE	344 Kc.	144°	281°
WA	251 Kc.	146°	144°

We then note the time and flying one
ading can proceed at our leisure with
e actual plotting. In order to plot a
eliminary or approximate fix we simply
d magnetic heading (compass heading
rrected with compass correction card
ounted in the ship) and relative bear-
g. If the sum of the two numbers is
eater than 360, subtract 360° from the
swer. Applying this to the three bear-
gs just taken we add magnetic heading
d relative bearing filling in the fig-
es on our work sheet.

tion	*Magnetic Heading*		*Relative Bearing*		
DL	145°	plus	221°	equals	6°
LE	143°	plus	281°	equals	64°
VA	145°	plus	144°	equals	289°

Now draw the three bearing lines in
om the compass roses around each sta-
n. Reciprocal courses are figured for you
each compass rose. Your approximate
sition falls in the little triangle formed
the cocked hat intersection of your three
sition lines. *(See illustration, page 51.)*
can be readily seen that the stations
osen should not be in a straight line rel-

(Continued on page 57)

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Fly Baby

(Continued from page 52)

turbulence and height of clouds. A five-day-old baby was flown from San Francisco to Los Angeles with its parents and no difficulty was encountered. Before the flight, the pilot checked his weather and found that he could fly down the coast line at less than 1,000 feet all the way. As an extra precaution, he had the infant checked by a Pediatrician—just to be sure.

One of the best experts on Aviation Medicine in this country is Harry F. Adler, Ph.D., M.D., Chief of the Department of Physiology of the Air University, School of Aviation Medicine at Randolph Field. Here's what he had to say when queried for this SKYWAYS' article on the subject of infants in flight.

"There is no reason to believe that a normal infant will have a poorer tolerance to altitude . . . than a normal adult. Certainly the altitudes attained by private planes (usually 1,000 to 8,000 feet) should not affect the human infant adversely.

"Just as important as the altitude obtained is the duration of time at any given altitude. Infants usually have a higher red blood count than adults . . . They should be able to carry just as much or more oxygen per unit of blood than does the adult and hence withstand hypoxia (lack of oxygen) just as well.

"The infant would normally breathe deeper and faster at altitudes in order to compensate for the decreased pressure of oxygen," continues Dr. Adler. "In this connection, the heart rate also would be faster at altitude than at sea level and the heart, as a pump, would attempt to become more efficient to get the blood around faster than usual.

"In some adults, and probably some infants or children, apprehension may cause increased irritability, perhaps to the point of spasms and convulsive movements of the muscles . . . If this 'hyperventilation' (deep breathing at higher altitudes) is carried on too long, the result is a 'blowing off' of too much carbon dioxide. This disturbs the acid-base balance in the body and . . . increased irritability by spastic and convulsive movements . . . results.

"Ear difficulties due to a difference in pressure on the two sides of the ear drum . . . may cause pain on descent from altitude. One could, to a great extent, prevent this poor equalization of pressure in the ears by giving the infant frequent swallows of water as the plane descends.

"On long flights the infant would certainly have to be fed. The milk can be kept warm in thermos bottles. If an excessive amount of air were swallowed with the milk, some difficulties such as colic could be expected if a child were unable to rid himself of the expanded gas as higher altitudes were attained.

"There is one danger, however, which one can think of as being of some concern, especially at altitudes of 8,000 to 9,000 feet. If fluids are ingested at altitude and if by accident some were to be aspirated (go down the wrong way), then more difficulty than usual would be encountered in coughing the material out. This is due to the fact that the efficiency of the cough reflex depends partially upon air density and that density of air is decreased at altitude."

UNITED AIR LINES' Capt. Gil Sperry and Mrs. Sperry take their nine-weeks-old son wit them on all pleasure flights that they make from Monrovia Airport in their Temco Swif

The conservative Journal of the American Medical Association reported that United Airlines conducted a survey during 1941 and 1942 on every baby flown. It stated that "a healthy baby reacts better to flight conditions than most adults. Babies were frequently flown with their mothers the moment they were released from hospitals following confinement."

This United Airlines survey continued: "An infant's ears adjust to altitude more easily than an adult's, probably because their Eustachian tubes are short and straight." (This tube leads from the throat to the middle ear and is operated by yawning or swallowing.)

"Air sickness is a rarity. There have been reports of vomiting, but this apparently is due to regurgitation of food when the infant is fed aloft. The gas expansion which takes place at altitude results in a regurgitation unless great care is taken to prevent the infant from swallowing air while being fed."

While infants and smaller youngsters should restrict their flying to cabin planes, this is due to the cold blast of air rather than noise. Dr. Adler states that "noise or vibration should have no more effect on an infant than does the noise of a vacuum cleaner or an automatic kitchen mixmaster. In fact, the usual kitchen mixer is probably just as noisy as an aircraft engine.

"No part of the infant should touch metal surfaces which can get very cold and conduct away a great deal of heat rapidly, even through blankets or clothing which are relatively efficient in retaining heat."

Changes in air pressure, aeroembolism (low pressure sickness), present more unknown factors than does mere lack of oxygen. This malady, similar to the "bends," is caused by the formation of bubbles in the tissues, the blood and other fluids of the body. Champagne, ginger ale or Coca Cola, bottled and capped under pressure greater than the atmosphere, react the same way as do the fluids in the body when pressure is reduced rapidly.

Since the air pressure at 18,000 feet is just half that on the ground, these great pressure changes take place at the higher altitudes. At heights normally flown by private "puddle-jumpers," no aeroembolism should be encountered. Under 10,000 feet, there should be no appreciable effect. Above 10,000 feet a youngster of 18 months or two years should be able to operate as well as an adult.

Youngsters who have been sick repeatedly should be flown with great care. Many an unpressurized airliner has made an emergency stop to discharge some youngster who was in trouble. Infants with frequent colds, congenital heart lesions or cardiovascular (heart and blood vessel) troubles should not fly during their first year. After that, they should go no higher than 5,000 or 6,000 feet on their first flights.

After having taken Sulfa drugs, no one—and that includes adults—should fly for at least five days since the action of the Sulfa affects the oxygen-carrying capacity of the blood.

Pilots who plan to have infants or small youngsters as passengers should run a careful check on the exhaust muffler and heater system of their planes to guard against carbon monoxide poisoning. Unfortunately, the red blood cells have a 200 times greater affinity for carbon monoxide than for oxygen. In addition, the lead content of exhaust gasses when tetra-ethyl fuel is used, forms disagreeable odors which may cause airsickness. These odors, naturally, are far preferable to the silent, deadly effects of carbon monoxide.

Flying parents who take their youngsters with them soon learn many short-cuts to keep the family happy in the air.

One of the prime advantages of flying

(Continued on page 56)

lot Report . . . New Navion

(Continued from page 43)

came up over the hump, skated down other side, and the *Navion* hopped into air. We had dropped about half-flaps, Doc Sloan's suggestion, to shorten the e-off roll. New on this model is the mid- flaps position which enables the pilot set his amount of flaps before take-off not have them creep either up or vn. The most efficient position for a rt take-off is to turn the wheel to full vn aileron and then drop the flaps to same degree. Excessive flap results in re drag than lift.

From "Rancho del Cielo" we headed th to San Marcos, a few miles inland of eanside. When we were at least 20 es out of town and only 2,000 feet up, c called the San Diego radio range sta- n to get the latest Los Angeles weather our return trip. Even at this distance, reception was perfect.

At 2,000 feet, using the recommended onomy cruising setting of 2100 rpm d 23 inches of manifold pressure, we re indicating 140 mph.

At San Marcos, we circled the airport d dropped the gear. Our pattern was a le high so we dumped full flaps while air speed was about 95 mph. Deceler- on was so fast that it forced us forward htly in the seat.

After landing we changed seats, putting . Williams in the pilot's compartment. climbed in back to see how the other half lives in the *Navion*. The newly added headrest is a sleep-inviting dream.

The back seat is spacious, even for a tall passenger. With the baggage compartment accessible in flight by lowering either half of the back seat, passengers need not divide their baggage into two parcels—that which they will need in flight and what they can get along without.

Adding a folding arm-rest in the middle of the rear seat is an additional factor in passenger comfort. Recessed arm rests make the seat nearly six inches wider. After all, if you design an airplane to fly up to 800 miles at a hop, there's no reason why the guys in the back seat shouldn't be as comfortable as possible.

While Mr. Williams was flying back to San Diego, we asked Doc Sloan about opening the canopy in flight so we could take pictures through the opening rather than through the plexiglas.

"Sure, you can open the hatch one notch in flight, but it is windy and noisy."

It was very windy in the cabin and bits of paper, cigarette ashes, etc., began whipping around the cabin. We decided it would be a lot simpler to shoot pictures through the plexiglas.

"You've got to be careful in closing this in flight," said Doc Sloan. "The thrust on the canopy is forward and if you let go of the release, the hatch will slam forward roughly into the windshield.

He eased forward on the release handle and the hatch crawled forward into the closed position. A quick flip of the overhead handle and the ship was all back in one piece again, the hatch tightly closed.

As we entered the busy traffic pattern at Lindbergh Field, we called San Diego Radio for the latest Los Angeles weather in preparation for our flight back to Monrovia. Scattered showers with six-mile visibility sounded like fairly easy flying.

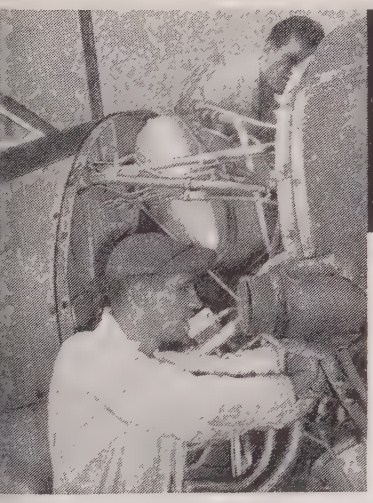
There is a large hill covered with apartment houses and telephone poles on the approach end of Lindbergh Field. Here again the excellent flaps of the *Navion* made a relatively high, safe approach a cinch without having to taxi a mile back up the runway.

As we taxied up to the Ryan parking ramp, Mr. Williams remarked about the changes that impressed him most.

"You've made some wise improvements in this model without tampering with the original excellent design. The added horsepower will be a great help for owners who frequent high-altitude fields and the soundproofing is swell. Ventilation is markedly superior to that on my older plane. Then the back-seat improvements with recessed arm rests, the center arm rest and the new head rest rolls are swell. I'm going to see about installing one of those head rests on my own ship."

Mr. Williams stopped the engine with the idle cut-off and we transferred over to the older *Navion*.

This latest refinement, 29 major changes in all, make the *Navion-A* an even better plane than earlier models. It's a pilot's plane with the accessories placed where he wants them. Out of unimproved, rough-and-rugged fields, this ship is a dream.



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Fly Baby

(Continued from page 54)

from a mother's standpoint is that she need not take so much baby food or so many diapers since she arrives at her destination much sooner than she would by car or train. A thermos bottle will keep milk warm while a second bottle will keep prepared baby food warm as long as necessary. Some mothers mix strained carrots, peas and liver all together and put it into their thermos. It's a fine idea as long as you can convince the youngsters it's OK.

If the youngsters are older than the diaper stages, some sort of a "pottie" is a must. The excitement of flight plus a little cold air will do it every time. That, incidentally, is a good project for the designers of current "family" airplanes to think about.

If the youngster still wears diapers, disposable paper tissues are fine if used with a little baby powder to prevent chafing, but they must be changed more frequently than the regulation three-cornered pants.

A youngster is usually less trouble in flight than on the ground. The hum of the motor and steady engine vibration combined with a partial lack of oxygen puts them to sleep quickly. Older children, however, should have toys or books to keep them happy.

Obviously, door and window catches should be saftied if there is any chance of a youngster reaching them. Many of the more modern airplanes are ideal in this respect. The *Navion*, for instance, has a single canopy lock that no one could open accidentally. However, ships like the new *Cub Clipper* would need some sort of a good safety lock on the left, back-seat door if small youngsters were to be turned loose in the ship.

Many parents put their small infants in a basket similar to a wicker clothes basket and place it either on the floor in the back seat of a four-placer or on the hat-rack ledge commonly found in two-place planes.

Many car seats work out well in flight. They give the small youngster a chance to sit up and see what's going on without having to be held on someone's lap. During take-off and landing, and in extremely rough air, the youngster should go under a safety belt, either with one of the parents or be strapped in an empty back seat. In rough air, parents can literally burp their youngsters on a cloud, but even the roughest air is no more extreme on an infant than being bounced on Grandpa's knee.

If they sit on the pilot's lap in flight the small movements of the controls fascinate infants. One can depend on them to hang on the controls and interfere slightly with the pilot's proficiency.

Just as on the ground, a small youngster will fuss less if he is held on someone's lap. Small babies come equipped with a built-in fear of falling, but their only worry is falling that foot-and-a-half off the seat, not 10,000 feet to the ground.

From a legal CAA standpoint, it is permissable to take any number of youngsters in a plane as long as the weight ar balance limitations are not exceede When Theodore Wertz of Sayre, Pennsy vania, was moving to a new job in L Angeles, he was faced with the proble of moving his wife, son and four daug ters. Charter pilot Bill Moreland mac this transcontinental flight with thr adults and five youngsters in a regul four-passenger *Navion*.

Here's how the eight people we seated. Father Wertz had the smalle child sit on his lap in the co-pilot seat, using the regular seat belt. Mr Wertz, also holding a small child on h lap, was on the right side of the re seat with an extension of the regular se belt. On the left side of the rear se there was room enough for three childre to sit, using the regular seat belt wit an extension. Total weight of the thr youngsters did not exceed 170 pounds.

Jim Most of Los Angeles thinks nothin of taking his wife and two daughter aged 15 months and five years, up f an outing in a standard 65-hp Taylo craft. The infant goes in the baggag compartment just back of the seat and th five-year-old sits on her mother's la Then there's plenty of room on the flo for their dog. Since neither parent is heavyweight, the gross load of the ai plane is not exceeded.

Since so many flying trips come up o the spur of the moment, it isn't a ba idea to keep a zipper-bag already packe with diapers, sleepers, a can opener f baby food, pablum, a baby spoon, gr ham crackers, sterilized water, safety pin sunburn lotion and a paper bag for soile diapers. Then if there's a rush in gettin to the airport, a parent has less chanc of forgetting some of the essentials.

Any toys or familiar objects will giv the smaller youngsters a partial sense o security and make them less apt to fu when they are away from home.

Parents on long trips will find tha most large hotels have lists of baby si ters who can be called to keep an ey on "Junior" while his flying parents go ou to dinner and look at the town. Whe wiring for reservations, it is a good ide to request a baby sitter at the same tim

If you think that an infant can appreciate flying, you're wrong. On infant, less than 8 months old, who ha traveled more by plane than by car wa sitting in the sunshine at the Lak Havasu fishing resort on the Colorad River. An outboard motor was starte nearby and the baby looked up, huntin for the noise. When the outboard die she continued playing only to look u again when the motor was restarted.

Why not start 'em young? Then the can grow up with the airplane just a their parents grew up with the automobil and their grandparents with the horse and-buggy. Any healthy infant today wi make a swell fly baby.

About the author: Dr. Ralph Netzle is one of Southern California's best-know pediatricians. He began his private medi cal practice in 1929 and served durin World War II as a Flight Surgeon a March Field. He has been flying sinc 1936, holds a private pilot's license, an has logged over 500 hours in the air.

Using Your ADF

(Continued from page 53)

ative to the plane's position. If they were, your position lines would coincide instead of intersect. The larger the intersection angle, the better the position fix. If you do not know which side of a station you are located on, the second bearing line drawn will tell you. Just draw the first bearing line through both sides of the station. The second line can intersect on one side only. Then disregard the other side. Now you have established your approximate position near Kenton, Ohio. This position should be accurate to within a few miles. If you want a closer check, apply the correction 0.6 degrees for meridian convergence and add or subtract variation differences. This will give you a still more accurate fix. Generally, both convergence and variation corrections have the same sign, either plus or minus. Applying the error to the same three station bearings:

Station	*Variation Correction*	*Convergence Correction*	*Corrected Bearing*
TOL	0°	0°	6°
CLE	plus 3°	plus 1°	68°
FWA	0°	minus 1°	288°

Plotting the new bearings, our actual position will be found only a few miles away from the original fix. Generally, if the stations chosen are not too far east or west of the plane, the errors will not be large. Stations due north or south give very small or no bearing errors at all.

The position fix we just took can be made using either automatic compass or loop nulls. If you used the loop, you discovered another method of eliminating the wrong null. Remember we learned that there are two nulls exactly 180° apart. Naturally, only one of them can point to the station. Also, it is only possible to be on one side of the station. When shooting a three-position fix using loop nulls, draw the first bearing line through both sides of the station. Then the second bearing line on station #2 will definitely eliminate one of the nulls. The two bearing lines can cross at only one point. The third station really proves the problem.

There is another very interesting and useful advantage provided by the radio compass. Perhaps your course line on some future cross-country flight will run exactly 15 or 20 miles left or right of a range station. It may also be possible that no other station is close enough for a cross-bearing check. It is possible, by using a simple formula and taking two bearings on the one station, to not only tell whether a range station is off to your right or left, but also how far away it is in miles or minutes.

Let's look first at the distance in miles formula—

$$\text{Distance in miles equals} \frac{\text{Ground speed x time}}{\text{Angle of change}}$$

If ground speed is not known, indicated airspeed will work very satisfactorily. The time referred to, is the time flown between first and second bearings. The angle of change is the difference in degrees between the two bearings. It is usually a good idea to make the time some even

(Continued on page 59)

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Dilbert

(Continued from page 37)

investigating the trouble after his first warning; and it didn't prevent him from being cited for proceeding into instrument weather on a VFR clearance. And it didn't repair the wrecked aircraft.

Tire Pressure—If you are having ground-loop trouble, look for under-inflated tires. A certain flight school investigated an epidemic of groundloops and found that tires were seldom checked on the line. Near-flats were taken care of, but mechanics claimed they, "didn't have any tire gauges" to make systematic checks. Gauges were provided and, with a little indoctrination, tire pressures were kept up. This was all it took to eliminate a large percentage of the groundloops.

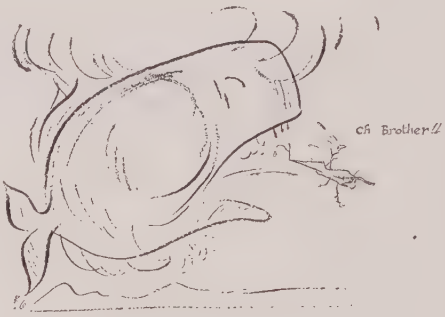
Include a visual tire check in your pre-flight inspection. You can soon train yourself to detect tires which are only a few pounds low, just as you can on your car.

Sunburn Dangerous For Aviators—Believe it, or not, that's what the medicos report. They have found that when a pilot gets himself nicely toasted during a weekend of sunbathing, he is almost certain to have greatly decreased his resistance to blackout and fainting.

It seems that sunburn, in some manner, impairs the circulatory adjustment to accelerative forces. The exact amount of this impairment cannot be predicted; in fact, due to one's general condition, it probably will vary even in the same person. Whatever your condition, however, it has been determined that sunburn definitely will increase your susceptibility to blackout and fainting. Tilt tests have shown that this susceptibility progressively decreases as the sunburn fades.

I don't want to be a killjoy regarding your weekend beach parties, but I contend that aviators always should be fully informed on all matters related to flying. And I always like to pass on any preventive advice. In the present case, the advice is not to engage in stunting or violent maneuvers while heavily sunburned. I, also, might recommend that aviators do their beach work at night, but then it's moonlight. I happen to know that many aviators are particularly susceptible on a moonlit beach. If you are of this group, maybe you better just stay home.

Attention Instrument Pilots—The best advice anyone can get about thunderstorms is to stay well clear of them. No aviator in his right mind, even an experienced instrument pilot, would deliberately fly into one. There is no quicker way to get to 30,000 feet—flat on your back.



However, just in case you accidentally get caught in heavy weather some day, you ought to know wherein lies your best chance of getting through. Here's the dope—distilled from experience:

1. Turn pitot heat on prior to entering storm activity.
2. Trim aircraft for level flight before entering the storm.
3. Check flight instruments for accuracy and correct operation.
4. Turn cockpit lights on before entering the storm.
5. Wear colored goggles to aid in preventing temporary blindness when lightning strikes.
6. Increase rpm and adjust cruising speed to about one and one half times stalling speed.
7. Don't attempt to maintain altitude—fly "attitude".
8. Don't over-control. Let the aircraft ride the storm, using only enough control to keep it from reaching a dangerous flight level or attitude.
9. Don't change power settings unless dangerous speeds are reached.

Remember, most aircraft are insufficiently stressed to stand this strain—*so don't test this procedure!*

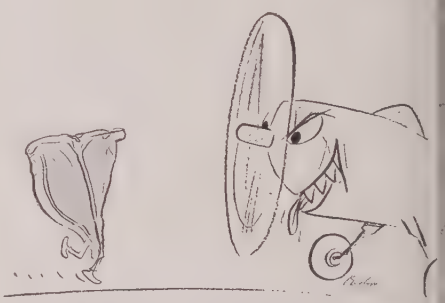
Prop Wins Again—After taxiing to the line to discharge his passenger, the pilot started conversation with a spectator. The experienced passenger disembarked unassisted and stepped off the leading edge of the low-wing plane—right into the propeller. Fortunately, it was idling, and he got away with only a fractured shoulder.

In another case, a spectator, while walking through a hangar, impulsively pulled down on a propeller blade. Although the cockpit switch was OFF, a loose magneto ground wire permitted the ignition to function; the engine started and sliced off three of his fingers.

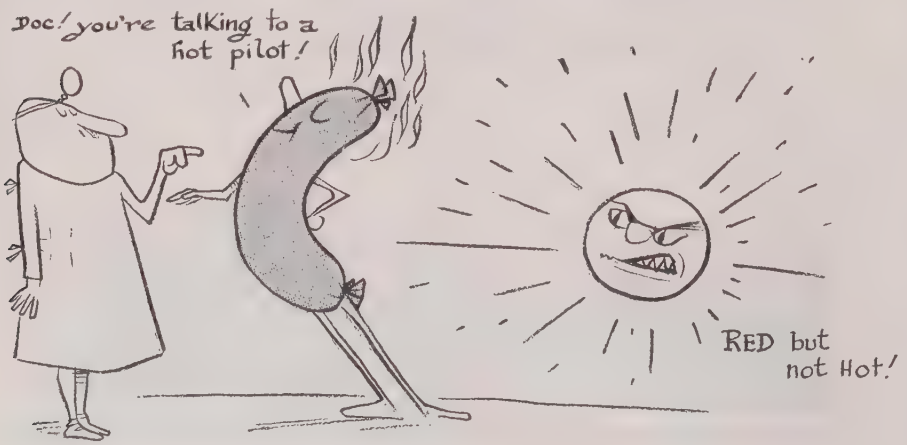
Just two examples to remind you that propeller accidents still occur, many under circumstances so ridiculous as to appear impossible—but they continue to happen. And I have never known a prop to lose an argument with an opponent, be it truck, hangar, airplane, cow or human being. A study of the propeller accident record shows another regrettable fact: *Practically every one was preventable if a reasonable amount of precaution had been used.*

Now, all of us know that a propeller is a lethal weapon, but constant association with this danger is apt to make us complacent about it. We even have an added responsibility in this matter and that is as regards the general public. Many of them are prop-ignorant and it is part of our job to keep them from injuring themselves.

Propeller accidents will continue just as long as flight personnel continue to dope off. So kick yourself in the mind occasionally to remain alert.



"Remember—you look like a steak to a prop"



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Using Your ADF

(Continued from page 57)

umber, such as, five or 10 minutes. The arther out you are from the station, the onger it will be necessary to fly between earings. A minimum angle change of 10° a desirable difference. Always start the roblem with the station on one wing tip r the other. In other words, the ADF eedle should point to 90° or 270° for ne first bearing. Let's suppose that after 0 minutes, the needle changes 30° to 40°. Rule number one states that the ide of the needle that moves to the ear is the side that the station is on. The eft side of the needle moved to the rear change point from 270° to 240°, so ne station is on the left. This also works ne same with loop nulls and demonstrates nother method of eliminating the wrong ull.

Let's apply our figures to the formula nd find out how far away the station ctually is:

$$\textit{Distance in miles equals } \frac{120 \times 10}{30} \textit{ equals } 40 \textit{ miles}$$

The station is 40 miles distant at the ime bearing #2 was taken. We can now roceed on course or turn and fly the econd bearing to the station.

It may be desirable to know the length f time in minutes out from the station. his is the formula to be used:

$$\textit{Time in minutes equals } \frac{60 \times \textit{time}}{\textit{angle change}}$$

Using the same figures as in the last roblem:

$$\textit{Time in minutes equals } \frac{60 \times 10}{30} \textit{ equals } 20 \textit{ min.}$$

It can readily be seen that one prob- em proves the other, because at a speed f 120 mph it takes 20 minutes to cover 0 miles. Memorize these formulas and ractice taking both loop null and radio- ompass bearings. An entirely new field of imple navigation will unfold for you.

If, on any future flight, your radios are endered inoperative by static from thun- erstorms or snow, try the loop antenna. lace the null or hole position of the loop n the wing tips. Because the loop is very irectional, it will then pick up signals nly fore and aft. This will eliminate any tatic caused by snow striking the wings. tatic from other sources in the direction f the wing tips will also be eliminated. etting out and grounding the trailing ntenna will also cut down static.

Range signals received on a loop antenna nay be inaccurate, due to the loop's irectional characteristics. A loop will roaden an on-course signal and may eceive an A for an N or vice versa. When ossible, switch to regular antenna close o the station, or rotate loop for a nose ull and disregarding signals, simply fly he null over the station.

After shooting a few bearings you vill become quite expert in navigating y radio compass. There is just one diffi- ulty that will arise. Your pilotage and lead reckoning will certainly suffer if you ly by ADF exclusively . . . but you'll ure get where you want to go.

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(Continued on page 62)

CLASSIFIED ADVERTISING

(Continued from page 61)

INSTRUCTION (Continued)

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Room With a View

(Continued from page 23)

though they can make available Mai liner 180's (DC-3's) for a flight necessary.

Communications with the six regior dispatch offices, with aircraft—Unite fleet totals 146 planes—in fact with the cities on the airline's system is maintain constantly by private telephone and tel type lines as well as radio. This room the nerve center. A phone rings and a d patch manager lifts it to find that Po land is on the other end of the wire, New York, Chicago, or Omaha.

These are but a sampling of the matte with which the managers, many of whc airline pilots themselves, are concerned.

In Newark a heavy volume of car is marked for shipment west. It is larg than even the big four-engined Carg liner, due to leave in a few hours, c handle. What can be done? Dispatch ma agers call Boston, Cleveland, or Ne York. A twin-engined Cargoliner, whi has just finished a routine check, is locat at Boston. It is started on its way.

It may be necessary to add a numb of extra sections to take care of hea weekend traffic. In order to set up adc tional flights, the correct number of t desired type of equipment must be locat and routed to proper originating statior

How many planes are in for period overhaul at the "push-button" mainte ance base at San Francisco? When w they be ready to fly again? How ma planes are currently in the air? How ma waiting to take off? Will services to t 80 cities, from coast to coast, along t west coast and across the Pacific Hawaii, have normal scheduled servi today, tonight?

The men in the little room can tell y in a few moments. They can also give t captain's name on Flight 612 just o of Seattle, or the gross load of Flight 1 en route to Baltimore and Washingto or advise you what time Flight 511, w be over Rock Springs, Wyo.

Although this room is headquarters f the flight managers, there is an adjoinir and more elaborate room—the "briefin room—where key officials representing phases of operations and passenger servi meet each morning to review yesterday operations and plans for those of the co ing 24 hours.

A huge system map of the airline is c one wall, with colored lights indicatir the weather at the cities served. In add tion, there are graphs and statistics c various charts which give information c a variety of subjects, from engine pe formance to revenue and load factors.

Whether it's 2 o'clock in the afte noon or 4 o'clock in the morning you wi find both rooms in use. Assistants a taking notes and keeping operational info mation up-to-date, bringing in weath reports fresh from teletype machines.

Outside, planes are taking off and lanc ing on the big Denver municipal airpor But the managers rarely bother to loc out the windows; for they know all abo what's happening here and everywhe along the Main Line. Actually, they hav a room with a 10,000-mile view.

National Air Races

(Continued from page 49)

7's and B-24's can be made into a
lget turbo-jet engine without too much
ible. A Los Angeles outfit is now mak-
orange grove heaters out of turbo-
erchargers and hopes to adapt them
r for a two-place sport plane.
A midget jet engine in a ship the size
our little *"Cosmic Wind"* and with
ractable gear would make a sweetheart
a racing plane. An engine with only
pounds thrust would produce speeds
about 450 mph. The jet engine would
bably be installed behind the pilot, just
in the F-80's, and the ships should get
and go like nobody's business.
t would take a course larger than the
sent two-mile Goodyear pattern for
se go-fast midget jets, and races would
essarily be not more than 30 or 50
es because of the high rate of fuel
sumption on a jet at low altitude.
But think of the public's interest in a
e of this type! Whenever anyone thinks
high speed in airplanes, they auto-
tically think of a jet engine. A midget
would have all the advantages of the
rent Goodyear racers; low cost, short
se-to-the-spectator race courses, ease
l speed of construction, plus the unex-
led promotional possibilities in a com-
ition of this type.
Personally, I think that there is an
remely good chance that a small jet-
ne racing class will be developed soon.
Actually, the management of the air
es at Cleveland has a rough problem
staging the annual classic. It isn't like
auto race where you can fence off a
k, bring in some grandstands, and be
business. In the first place, a minimum
$100,000 in prize money must be
anged for and guaranteed. Temporary
ndstands and pylons must be installed.
thorized judges and referees must be
hand, and announcing amplifiers are
absolute necessity for the huge crowds.
en there's the problem of handling up
1200 visiting lightplanes that bring
ctators to the races, as well as the
blem of coordinating all the military
ibitions. It's no cinch, believe me.
From a competing pilot's standpoint,
vever, the races would be safer if
ergency flight strips could be marked
and cleared along the back stretch of
closed courses. Then there's always
problem of spectators swarming all
r the racing planes as they are parked
the hangars. It's a headache to have to
nb over a hundred people to get to
r airplane. But . . . it's that public
erest in racing planes that fills the
ndstands and the race purses.
One way a good many pilots will cut
vn on their expenses this year will
by flying their racers—and that in-
des the midgets—to the races instead of
ting them on a trailer and towing them
Cleveland and back. Last year we fig-
d that it cost us roughly $1,000 in
enses for each of the three *"Cosmic
nds"* that we towed to Cleveland. We
not only auto expense but the time
trouble of assembling and disassem-
g the planes. It takes three days and
nts to tow a trailer to Cleveland from
Los Angeles, but we can make the flight at over 170 mph in roughly 14 or 15 hours. We need not add to the gas capacity but merely change props and use a mixture control. At 8,000 to 10,000 feet, we could safely go 400 miles per hop with our regular 15-gallon gas tanks.

Steve Wittman and Bill Brennand flew their two Goodyear racers to the Pacific Coast and back for a series of races this spring. They averaged 160 mph on the cross-country flight—just loafing!

There always seem to be more qualified pilots who want to get into racing than there are good racing planes. Ex-fighter pilots are especially good at closed-course racing. The most important thing in racing, however, is a *good* airplane that flies well and is completely stressed to take the loads encountered in steep, high-speed turns. I can tell in a 10-minute flight whether or not an airplane is safe to race, but after all, that's what I do every day for Lockheed. The Professional Race Pilots Association now has a technical committee of three men, Willis Hawkins, Gene Frost and Phil Coleman, who pass on all racing plane drawings before the ships are ever built. These three engineers are all top men on the Lockheed payroll and they have donated a portion of their time to the Race Pilots Assn. in an effort to keep obviously dangerous designs from ever being built. They can tell in a few minutes of study just how a given design should handle in the air. Weight and balance changes are so critical on these little ships that a little professional advice on the basic design can save a headache.

When the checkered flag drops on the Thompson Trophy Race this year, watch for some changes that may make it possible to put on a big-time air race in the New York and Los Angeles area as well as Miami and Cleveland. With less expensive, more closely competitive planes, there would be nothing to stop the establishment of one big-time race each year for every section of the country.

And those midget jets—just wait!

Editors Note: We had hoped to be able to bring our readers a complete line-up of entrants in this year's National Air Races at Cleveland, Ohio. At presstime, however, this list was not available. A late report from Beech Aircraft informs us that while they had considered sponsoring a light-plane X-C race this year, plans for this have had to be postponed. Should the race be included in next year's Nat'l Air Race program, it will be a X-C race from California to Cleveland for standard model lightplanes. Watch for future issue of SKYWAYS which will bring readers the winners of the races.

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